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ARMY CONCEPT TEAM IN VIETNAM
APO San Francisco 96243

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**ARMOR ORGANIZATION FOR
COUNTERINSURGENCY
OPERATIONS
IN VIETNAM (U)**

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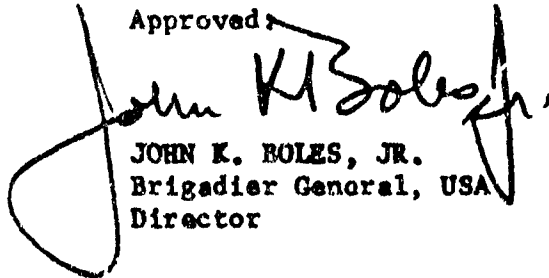
REPORT EVALUATION BY DIRECTOR, JRATA

The conclusions and recommendations of the report are adequately substantiated. There is a definite requirement for armored units in pursuing the counterinsurgency effort in Vietnam. A hard hitting, highly mobile combat unit can be highly effective in isolating the battlefield, pursuing a dislodged enemy, or in long range patrol operations into enemy havens. The ARVN units, as pointed out in the report, have either not been employed in these roles or, when employed, have not aggressively carried out the mission. The principal ingredients necessary for proper armor employment, as I see it, are specific written doctrine which will provide a point of departure for the junior leader, and effective dynamic leadership. The former can and should be produced by the ARVN Armor School. The latter is a matter which must be instilled by both the Armor Command and the Armor School by promoting the unique qualities of armor; the firepower, shock action, and mobility; in order to develop a high degree of esprit de corps. One other vital point is the education of other officers of other branches in the proper utilization and employment of armor. With an aggressive program incorporating the foregoing, the armored units will be a definite asset to the counterinsurgency program.

While I concur in the requirement to provide adequate armor to the current ARVN structure, I do not concur that these additional units must of necessity be organized within ARVN. Such constitutes only one course of action. The urgency of the situation demands a more rapid response than may be possible within the limited personnel assets of the Republic of Vietnam. Therefore, I believe that consideration must also be given to meeting the total armor requirements through the deployment of US and/or third country armor resources to augment those of ARVN. A most effective team could be organized by marrying up ARVN Infantry, Rangers or Marines with tanks and armored personnel carrier units from the First World Forces. I, therefore, recommend that MACV consider the recommendations as reflecting the total requirements to support current ARVN commitments, and that MACV determine the most responsive and most economical course of action to satisfy those requirements.

With the above exception, I concur in the recommendations of the report.

Approved:


JOHN K. BOLES, JR.
Brigadier General, USA
Director

15 March 1966

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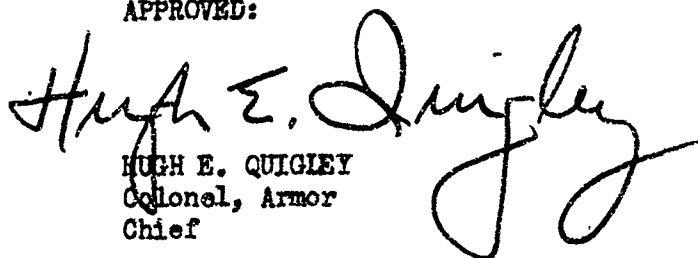
FINAL REPORT

**ARMOR ORGANIZATION FOR
COUNTERINSURGENCY
OPERATIONS
IN VIETNAM (U)**

JRATA Project No. 1B-156.0

9 February 1966

APPROVED:


HUGH E. QUIGLEY
Colonel, Armor
Chief

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Letter, AGAM-P(M) (17 Jul 64) COSFAR, DA,
31 Jul 64, subject: Army Troop Test Pro-
gram in Vietnam (U), as amended.

CINCPAC message DTG 120214Z Jan 65

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I. (C) PREFACE

A. ABSTRACT

The purpose of this project was to study and evaluate the organization, equipment, support, and employment of armor units of the Army of the Republic of Vietnam (ARVN) in relation to their capabilities and missions in counterinsurgency in order to determine their adequacy and methods for improving ARVN armor capabilities.

The evaluation consisted of observing all six ARVN armored cavalry squadrons and selected Regional Force armored car platoons, and interviewing commanders of these units, their US advisors, and staff officers and US advisors of units to which the ARVN armor units were organic or attached. In addition, a review was conducted of TOE's, maintenance and logistical records, lesson plans and after-action reports, and the training function including programs of instruction. An assessment was made of the effect of enemy anti-armor weapons, tactics and techniques of ARVN armor operations, and the influence of terrain and weather on armor employment in each corps area. Finally, an analysis was made of the effects and significance of this information.

The evaluation determined that armored cavalry squadron headquarters and tank units were not being used effectively; that more M113's, new armored cars, and additional squadron headquarters were needed; that the influence of the ARVN Armor Command conflicted with the proper exercise of command by tactical commanders; and that deficiencies existed in the development of ARVN armor doctrine and in the training of officers to employ combined arms teams.

From this evaluation it appears that further efforts are required in the identification of materiel characteristics and the development of equipment suitable for counterinsurgency operations in underdeveloped areas, and that training, doctrine development, and command relationships in ARVN are areas for potential improvement.

B. OBJECTIVES AND METHODS

1. Objective 1 - Missions

Analyze the missions available and the missions assigned to ARVN armor units.

The methods for meeting objective 1 were to review the TOE mission statements of armor units; search unit records; interview armor unit commanders and their advisors; and interview commanders, staff

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officers and advisors of units to which the armor units were organic or attached.

2. Objective 2 - ARVN Tactics and Techniques

Evaluate the tactics and techniques employed by ARVN armor units and compare ARVN armor employment with appropriate US doctrine.

The methods for meeting objective 2, with the addition of reviewing RVNAF school instruction on armor employment and observing operations, were the same as those for objective 1.

3. Objective 3 - Enemy Tactics, Techniques, and Weapons

Determine the tactics, techniques, and weapons employed by the Viet Cong against ARVN armor formations.

The methods for meeting objective 3 were to search records of RVNAF ordnance depots and armor units, review intelligence publications, inspect armor vehicles which had been subjected to hostile fire, and interview individuals as in previous objectives.

4. Objective 4 - Influence of Physical Environment

Determine the effects of the physical environment on the employment of ARVN armor units.

The methods for meeting objective 4 were to observe terrain and weather conditions that prevailed in the various parts of Vietnam and to interview personnel.

5. Objective 5 - Organization, Equipment, and Composition of Units

Determine if ARVN armor units are properly organized and equipped for counterinsurgency operations and if the types and number of armored vehicles are adequate for counterinsurgency operations.

The methods for meeting objective 5 were the same as those for objective 2.

6. Objective 6 - Logistical Support Requirements

Determine the logistical support requirements of ARVN armor units in counterinsurgency operations.

The methods for meeting this objective were to search unit records and to interview personnel.

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C. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Additional armored cavalry squadron headquarters and headquarters troops, mechanized rifle troops, and armored car platoons are required in RVN. Armored car troops are, however, not required in armored cavalry squadrons. The light tank and armored cars in use do not possess characteristics required for Vietnamese counterinsurgency operations. Furthermore, they are unsuitable because they are worn out. The squadron headquarters are used inadequately and armored units are not effectively integrated into combined arms teams when the occasion to do so exists. The influence of the Armor Command conflicts with the proper exercise of command by tactical commanders and instruction in the RVNAF schools is deficient with regard to armor employment in combined arms operations. The Viet Cong anti-armor weapons and techniques do not prevent the effective use of armor except in areas of poor visibility and restricted mobility.

It is recommended that an armored cavalry squadron, consisting of a headquarters and headquarters troop and at least two mechanized rifle troops, be made organic to each division, and a tank troop be organic only to each of those squadrons operating in an area suitable for the employment of tanks. An M106 4.2-inch self-propelled mortar platoon and an armored car platoon should be made organic to each squadron headquarters troop. Province chiefs should be made responsible for convoy escort and route security and be provided sufficient platoons with new armored cars to accomplish the mission. It is further recommended that suitable replacements be obtained for the M24 tank and M3, GM15, and Ford Lynx armored cars and that instruction in the RVNAF Command and General Staff College and the Infantry School be revised to present doctrine and tactical training which will produce more effective employment of armor in combined arms operations. The Armor Command should be divested of any official or unofficial command influence over tactical armor units and should address itself to its responsibilities for developing armor doctrine and tactics, assisting in the development of improved materiel, and monitoring armor branch training.

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II. (C) INTRODUCTION

A. PURPOSE

The purpose of this project was to study and evaluate the organization, equipment, transport, and employment of armor units of the Army of the Republic of Vietnam (ARVN) in relation to their capabilities and missions in counterinsurgency in order to determine their adequacy and methods for improving ARVN armor capabilities.

B. BACKGROUND

In 1950 the French Army organized a Vietnamese reconnaissance company and designated it Reconnaissance Squadron Vietnam. This company, the first Vietnamese armor unit, was made up of French officers and Vietnamese enlisted men. Its equipment consisted of M3 armored cars, M3 half-tracks, M3 scout cars, and an M3 howitzer.

By 1952 this force had grown to seven separate companies and Vietnamese officers had been installed as platoon leaders. The units were deployed as follows: two companies in the south, one company in the central coastal area, three companies in the north, and one company in the central highlands.

From 1953 through 1954, Vietnamese officers began assuming command of the companies. During this same period, the French organized the 3rd Reconnaissance Regiment, composed of the three northern companies plus a newly activated headquarters company.

After the Geneva Accords of 1954, the French began to turn over M24 light tanks to the Vietnamese. In 1956, the 3rd Reconnaissance Regiment was redesignated the 3rd Armored Cavalry Squadron. The 1st, 4th, and 2nd Armored Cavalry Squadrons, in that order, were then activated by grouping the other separate reconnaissance companies. Each of these squadrons was composed of two reconnaissance troops (M3 cars, M3 half-tracks, and M3 scout cars) and one tank troop (M24).

In the spring of 1962, MAAG-Vietnam provided ARVN sufficient M113's to organize two mechanized rifle companies. The success of these two companies during the last 6 months of 1962 led to the shipment of additional M113's to the Republic of Vietnam (RVN). Four armored cavalry reconnaissance troops, equipped with the armored command and reconnaissance vehicle, M114, were also organized and two mechanized rifle troops (M113) were made organic to each of the four armored cavalry squadrons. In addition to these troops, each squadron was composed of 1 tank troop with 17 M24 tanks and 1 armored cavalry reconnaissance troop with 20

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M114 command and reconnaissance vehicles. One armored cavalry squadron was attached to each ARVN corps.

In December 1963, two additional squadron-size armor units were formed: the 5th Armor Group and the 6th Mechanized Battle Group, later redesignated the 5th and 6th Armored Cavalry Squadrons, respectively. The 5th Armor Group was composed of the tank troops from the 1st and 2nd Armored Cavalry Squadrons and former Presidential Guard elements, and the 6th Mechanized Battle Group was composed of one mechanized rifle troop each from the 2nd and 4th Armored Cavalry Squadrons and the armored cavalry reconnaissance troop (M114) from the 2nd Armored Cavalry. A mechanized rifle troop of the 1st Armored Cavalry Squadron was then attached to the 2nd Armored Cavalry Squadron. (See annex C for organization of each squadron.)

In March 1964, the Military Assistance Command, Vietnam (MACV) and the High Command, Republic of Vietnam Armed Forces (RVNAF), decided to replace, because of limited trafficability of the M114, four M114-equipped troops with mechanized rifle troops (M113) and to organize two new mechanized rifle troops. This was begun in May 1964 and completed in July 1964.

In March 1965 a shipment of 12 M41A3 tanks arrived in Vietnam. These were the first of a total of 100 tanks that were to be shipped to Vietnam to replace the M24 tanks.

During the summer of 1964, the Army Concept Team in Vietnam (ACTIV) completed the evaluation reports "Mechanized Rifle Troop (M113) (U)", dated 25 June 1964 and "Armored Cavalry Reconnaissance Troop (M114) (U)", dated 5 July 1964, which pointed up the desirability of evaluating the overall ARVN armor organization in counterinsurgency operations.

C. SCOPE

1. Definition of the Project

The project included documentation and analysis of the organization, equipment, support, and employment of ARVN armor units. These were compared with the units' capabilities and assigned missions in order to determine adequacy for counterinsurgency operations and methods for improving ARVN armor capabilities. In addition, Viet Cong (VC) tactics, techniques, weapons, and the various aspects of the physical environment were analyzed to determine their effects on the employment of armor in RVN.

2. Setting of the Project

a. Environment

The project was conducted throughout the Republic of Vietnam which enabled evaluation of armor unit operations to be made in coastal plain,

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highland, and delta terrain. It was the dry season in the delta and central highlands and the wet season along the coastal plain during the evaluation and all weather conditions common to RVN were thus taken into consideration. (See annex A.)

b. Military Elements

All six of the ARVN armored cavalry squadrons were evaluated. The 1st through the 4th Armored Cavalry Squadrons were organic to the four ARVN corps, while the 5th and 6th Armored Cavalry Squadrons were part of the Joint General Staff reserve and were attached to the corps and divisions as required.

D. EVALUATION DESIGN

1. Methodology

a. Data Collection Methods

Data were collected by the ACTIV evaluators and project officers who recorded observations on the training and operations of armor units. Interviews were conducted with senior ARVN commanders, their US advisors and the advisors' staffs, as well as with ARVN unit commanders and their US advisors. In addition, terrain studies, after-action reports, and maintenance, POL, and ammunition records were obtained from the units. Information on VC tactics, techniques, and weapons was obtained from MACV J2.

b. Analysis Methods

The observations, interviews, and after-action reports were analyzed to determine the missions assigned to armor units and the tactics and techniques employed to accomplish these missions. Information on VC tactics, techniques, and weapons, and terrain studies were analyzed to determine their effect on armor employment. Interviews, after-action reports, and maintenance records were examined to determine equipment inadequacies, and POL and ammunition records were screened to determine logistical problems.

2. Limitations and Variables

The only significant limitation was also a variable--the lack of employment of the armored cavalry squadrons throughout the Republic of Vietnam. The principal variable was the differing manner of employing armor units in the four corps of RVN.

3. Support Requirements

Letter No. 242, MACV, 19 January 1965, subject: Evaluation -

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Armor Organization for Counterinsurgency Operations in Vietnam (1B-156.0) (U) informed US advisors to Vietnamese Army corps of the evaluation and its purpose, and directed assistance to the maximum extent consistent with the local combat situation. The letter also authorized ACTIV project officers and evaluators liaison and direct coordination with interested agencies. No equipment was required for the evaluation. Two field grade officer evaluators on 120 days temporary duty from Korea and two clerk-typists on 120 days temporary duty from Hawaii were made available by United States Army, Pacific. Temporary duty funds were provided by the United States Army Combat Developments Command.

4. Time Schedule

The following were critical events in the evaluation:

- a) Evaluators arrived on 13 February 1965.
- b) Clerk-typists arrived on 1 April 1965.
- c) Data collection began 15 February 1965.
- d) Data collection ended 15 May 1965.

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III. (C) DISCUSSION

A. OBJECTIVE 1 - MISSIONS

1. Squadrons

a. TOE Missions

The TOE missions for the armored cavalry squadrons are shown in annex B. These mission statements are general and, except for those of the 1st and 2nd squadrons, were in keeping with the apparent capabilities of squadron organizations, shown in annex C. The mission statement for the 1st and 2nd squadrons specified that they were to " . . . attack or defend with organic tank and rifle units" but neither squadron had any organic tanks.

b. Assigned Missions

The 1st through 4th Squadrons were each assigned to a corps and had received standing missions (that is, missions of a continuing nature) from the corps. These standing missions, shown in figure 1, varied widely among the four corps. Two missions, common to all four squadrons, were that of being part of the corps reserve and that of providing an M113 troop to each division in the corps. The 1st, 2nd, and 4th Squadrons were assigned the responsibility for overall route security within their corps area. Two of the squadrons, the 1st and the 3rd, had been given installation security missions and two, the 1st and 2nd Squadrons, had been instructed to control, on corps orders, the operational employment of tactical formations involving M113 troops. The 5th and 6th Squadrons were assigned to the RVNAF High Command (now the Joint General Staff) and designated RVNAF reserve. Both squadrons had been assigned additional specific missions but the all-tank 5th Squadron was charged with security of Tan Son Nhut Air Base and the Capital Military District, and the all-M113 6th Squadron (less one troop) was placed under the operational control of the 7th Infantry Division in IV Corps.

c. Missions Performed

The type and number of missions actually performed by the six armored cavalry squadrons during 1964 and the first half of 1965 varied even more than the types of standing missions assigned. Figure 2 shows the types of missions actually performed by armored cavalry squadron headquarters and indicates which squadron had performed the mission. In some cases the squadron headquarters performed a given type of mission more than once and in some cases more than one mission was performed during one operation. Figure 3 shows the number of operations conducted from 1

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<u>Missions</u>	<u>Squadron</u>
Corps reserve	1 2 3 4
Provide M113 troop to each division within corps	1 2 4
Maintain route security within corps area	1 2 4
Provide security for specified installation or area	1 3 5
Control operations involving M113 troops	1 2
RVNAF reserve	5 6
Direct support of a division	6

(C) FIGURE 1. Standing missions assigned to ARVN armored cavalry squadrons.

January 1964 to 15 May 1965 by each squadron headquarters, including those operations conducted by a higher headquarters in which the armored cavalry squadron controlled or coordinated subordinate units.

<u>Type of Mission</u>	<u>Squadron</u>
Control reaction forces	2 3 6
Control offensive operations against known or suspected VC units	1 2 4 6
Control search and clear (destroy) operations	1 2 3 4 5 6
Control route security forces	3
Control convoy escort forces	3
Control forces interdicting VC infiltration routes and safe areas	3
Provide protection and assistance to civic action teams	3
Control forces defending fixed installations	3 4

(C) FIGURE 2. Types of missions performed by armored cavalry squadron headquarters from 1 Jan 64 to 15 May 65.

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<u>Squadron</u>	<u>Duration of Operation in Days</u>					<u>Total Operations</u>
	<u>1</u>	<u>2 to 7</u>	<u>8 to 14</u>	<u>15 to 31</u>	<u>31+*</u>	
1st			2			2**
2nd						17***
3rd	3		1	1		15****
4th		1			1	2
5th			1			1
6th	3	7			1	11

(U) FIGURE 3. Number and duration of operations conducted by squadrons from 1 January 1964 to 15 May 1965.

d. Potential Missions

There were no appropriate missions for armor which had not been assigned to the armored cavalry squadrons at one time or another. However, corps and divisions frequently failed to make use of squadron headquarters as control headquarters when they were readily available. This situation, which existed to a greater or lesser degree in all four corps, was described by one squadron advisor as follows:

The squadron headquarters is little used. It can be used in any of the divisions tactical areas as a control headquarters for infantry and armor units. However, there are rarely operations conducted which use more than one mechanized rifle troop in an area, and these are habitually under the control of the infantry unit which is conducting the operation. There appears to be no shortage of control headquarters in ARVN and evidently the divisions prefer to use their organic control headquarters rather than an attached one. This problem should be reduced if present plans to make the squadrons organic to the divisions are placed in effect. In the past, it appears that the corps has committed its reserve units in battalion size. Hence, there has been no use of the squadron headquarters as a control unit for the corps reserve

*No operation lasted longer than 74 days.

**No information available for operations in 1964.

***Only the total number of operations conducted in 1964 are available.

****Includes 10 operations of undefined duration in 1964.

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since each battalion has its own headquarters. I personally feel that a factor in the lack of use of the squadron headquarters is the rank of the commander. He is a lieutenant colonel, while all of the infantry battalion commanders are captains. Many of the infantry regiments are commanded by majors and some by lieutenant colonels. If the armored cavalry squadron commander were to be used in a task force there is considerable possibility that he would be senior to the infantry commander controlling the operation. This situation is prevented from occurring by not assigning the armor squadron headquarters to a task force. I feel that the commander of this squadron is fully capable of commanding and controlling operations which include both infantry and mechanized units, for he has successfully done so on occasions in the past.

Not all missions assigned to the armor squadrons by higher headquarters were missions that could be best performed by an armor unit and others, while normally expected of armor units, were beyond the capability of the squadrons to accomplish. Three squadrons had standing missions of defending fixed installations, a mission for which an infantry unit is much better suited. This mission did not capitalize on the armor units' major asset, mobility, and it put them in their most vulnerable situation, stationary defense.

Another mission frequently beyond the capability of an armored cavalry squadron was that of corps reserve. This was the case with the 1st Squadron (III Corps) whose tactical units, three M113 troops and one armored car troop, were usually under the operational control of the divisions and the Phuoc Binh Thanh Special Zone, and were normally committed and deployed apart from the squadron headquarters.

2. Mechanized Rifle Troops

a. TOE Mission

The TOE mission of all mechanized rifle troops was "To close with the enemy, capture or destroy him. To make hasty river crossings, raids in force, and harassing operations to destroy enemy guerrilla bases". This mission appeared to be in keeping with the organization of the mechanized rifle troops, shown in annex C.

b. Assigned Missions

It is ARVN policy not to require that each troop have a

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standing mission. Except for two mechanized rifle troops in the 6th Squadron and one in the 1st Squadron, none had standing missions assigned. One of the troops of the 6th Squadron was attached to the 3rd Squadron and under operational control of II Corps. Of the two 6th Squadron troops remaining in IV Corps, one had the standing mission from corps to act as a reaction force and the other to perform road security. One of the mechanized rifle troops of 1st Squadron had a standing mission as a reaction force in corps reserve which was controlled by 1st Squadron headquarters.

c. Missions Performed

The missions performed by ARVN mechanized rifle troops have been discussed in detail in the ACTIV report "Mechanized Rifle Troop (M113) (U)", dated 25 June 1964. The missions performed at that time were still being performed during the present evaluation. Of those missions, the following did not appear to make best use of the mechanized rifle troops' capabilities: convoy escort, route security, search, and blocking missions.

Convoy escort and route security missions were performed by M113 troops in the 1st, 2nd, and 6th Squadrons. These operations were essentially restricted to the few main roads used for hauling military supplies and commercial traffic and were within the capabilities of M113 units but, since they were road operations, the off-road movement capability of the APC's was not being used and, in the case of convoy escort, the wheeled convoys were limited to M113 road speed. Moreover, road operation accrued mileage rapidly and wore out the APC's more quickly than it would have armored cars. Because of a shortage of operative armored cars it was necessary to use the M113 troops in convoy escort missions with the realization that their full capabilities were not utilized.

In the 2nd Squadron, where M113 troops were employed frequently in conjunction with dismounted and airmobile infantry units, there were two missions assigned them from time to time that could have been performed better by infantry units. These were search missions and blocking missions. The search missions required a high density of men on the ground to search villages and other areas thoroughly and methodically for hidden weapons, personnel, and other supplies. Considering units of equal strength, an M113 unit was not as effective in performing this mission as was a dismounted infantry unit. The M113 units were relatively less effective in blocking because their mobility capability was not being used. Normally a blocking mission was coupled with a sweep or some other offensive action against a known or suspected VC unit. Given both dismounted infantry and APC's, it would have been a more effective use of the capabilities of each to sweep with the APC's and drive the VC into a killing zone before a dismounted infantry blocking position.

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d. Potential Missions

There were two missions within the capabilities of ARVN mechanized rifle troops that were not frequently assigned or performed. The first of these was closing with the enemy and destroying him by fire and maneuver while dismounted. The practice of dismounting the organic riflemen for assault and maneuver through terrain impassible to the armored personnel carriers had decreased since the ACTIV evaluation of ARVN mechanized rifle troops conducted early in 1964. Since that time the M113 had come to be used more as a fighting vehicle than as a personnel carrier.

The second mission within the capabilities of mechanized rifle troops, but one that was rarely assigned or performed, was that of exploitation and pursuit. The failure to exploit or pursue appeared to result from an inflexibility in ARVN command structure and will be discussed under objective 2.

3. Tank Troops

a. TCE Mission

The TCE mission of all ARVN tank troops was "To close with and destroy enemy forces, using fire, maneuver, and shock action in coordination with other combat units". This mission appeared to be in keeping with the apparent capabilities of the unit organization shown in annex G.

b. Assigned Missions

Tank troops were assigned only one standing mission, that of providing security for fixed installations. Of all the missions they might have had, this was the least compatible with their capabilities and kept them from being employed in more profitable roles. Defense of such installations as the II Corps headquarters in Pleiku and Tan Son Nhut Airbase in Saigon could have been performed much better with infantry units than with tanks. Deployment of tank units with static security missions in the Saigon area obviously had other than tactical motivation.

c. Missions Performed

During the evaluation ARVN tanks were rarely employed. When they were employed it was by platoon with the mission of providing direct support to units conducting search and destroy operations.

d. Potential Missions

The potential mission which ARVN tank troops might have been assigned was as stated in the tank troop TCE. (See annex B.)

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4. Armored Car Units

a. TOE Missions

The ARVN armored car troop TOE mission was "To perform reconnaissance and provide route security for the unit to which assigned. To perform light combat missions. To provide area security". The TOE mission of the Regional and Popular Force armored car platoons was "To clear roads, maintain security of roads and bridges, patrol, and escort. When reinforced, provide interdiction support to stationary posts and conduct small operations". Except for the missions of reconnaissance, performing light combat, and conducting small operations, the TOE missions of both types of armored car units appeared to be in keeping with the apparent capabilities of the unit organization and equipment. The poor cross-country mobility and lack of an amphibious capability in the RVNAF armored cars during the evaluation precluded the effective conduct of off-road missions.

b. Assigned Missions

Convoy escort and road security were standing missions assigned to the armored car troops of the 1st through 4th Squadrons. In addition, 1/4 Troop, under operational control of I Corps, had been assigned the standing missions of reinforcing outposts, static security of installations in the Da Nang area, and providing a reaction force for Da Nang Special Zone.

The convoy escort and route security mission assigned to the armored cavalry squadron armored car troops was questionable. All sources interviewed agreed that the armored cars were the best vehicle for this role but both of the ACTIV evaluators and two out of three advisors to squadrons having armored car troops believed the responsibility for convoy escort and route security should be territorial and rest with Regional or Popular Forces (RF/PF), not with the armored cavalry squadrons. If convoy and route security missions were transferred to RF/PF units, armored car platoons organic to the cavalry squadrons would be released to perform combat operations, provide security for combat resupply of troops of the cavalry squadrons, and provide movement security for commanders, staffs, and advisors of the armored cavalry squadrons. Members of the senior advisory staff to RF/PF shared the same belief but said that in order to perform this mission new armored cars would be required because of the poor mechanical condition of the obsolete armored cars then in use (Canadian Ford Lynx and GMI 5's).

Since the end of the data collection period, Department of the Army decided to procure Commando armored cars through the Military Assistance Program to replace the MB's, Lynxes, and GMI 5's in use by RVNAF. With the introduction of new armored cars in FY 66, it should be possible to accomplish the convoy and road security missions effectively and economically

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with armored car units.

c. Missions Performed

The most frequent missions performed by ARVN and RF armored car units were convoy escort and route security.

d. Potential Missions

The armored car units of both ARVN and RF performed all types of missions within their capability.

5. Headquarters Troops

a. TOE Missions

The TOE mission of armored cavalry squadron headquarters troops was "To provide command and control, supply and maintenance for the armored cavalry squadron". This mission appeared to be in keeping with the apparent capabilities of the troop organization, annex C.

b. Assigned Missions

There were no missions assigned the squadron headquarters troops beyond those listed in the TOE. (See annex B.)

c. Missions Performed

The missions actually performed by the squadron headquarters troops did not use fully their command and staff capabilities. Since the squadrons were seldom called upon to provide command, control, and staff operational planning and supervision of tactical operations, or tactical communications, their actual function as a headquarters was in supply, administration, and organizational maintenance. Several advisors and other qualified observers stated that the assignment of an armored cavalry squadron to each division rather than to each corps probably would have used the armored cavalry squadron headquarters more effectively in the command and control role. If they should remain assigned to corps and be employed as they have been it would appear to be more economical in personnel to eliminate from the squadron headquarters some of the spaces provided for tactical operations planning, control, and supervision.

d. Potential Missions

The mission that could have been performed more frequently by the headquarters troops was that of providing tactical command and control.

6. Other Agencies Having An Influence on Armor Units

Although the evaluation addressed itself to ARVN armor units, it

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appeared necessary also to investigate the influence of the RVNAF Command and General Staff School, the ARVN Infantry and Armor Schools, and ARVN Armor Command on ARVN armor units. The TCE missions and capabilities of these agencies are shown in annex B. With the exception of the portion of the Armor Command mission, "to command all armor units, if required; and to command directly all general reserve armored units", the TCE missions of these organizations appeared to be within their organizational capabilities and to be missions normally expected of such organizations. The command aspects of Armor Command will be discussed under objective 2.

7. Findings

a. Even when opportunities for employment existed, corps and divisions were reluctant to use armored cavalry squadron headquarters to control operations.

b. In one division area the squadron was required to perform convoy escort and road security missions with M113 units.

c. The armored cavalry squadron headquarters usually functioned only in the supply, administration, and organization maintenance roles.

d. Tank units were assigned static security missions which could have been performed better by dismounted infantry units.

e. Mechanized rifle troops were assigned convoy escort and route security missions because of a shortage of operative armored cars in both RF/PF and ARVN units.

f. Armored cavalry squadron headquarters were designated corps reserve in all four corps areas. In two squadrons there were no combat units under squadron control and each of the other two squadrons had only a tank troop.

g. Qualified evaluators and US advisors believed that armored cars and the mission of convoy escort and road security should be assigned to Regional and Popular Forces rather than to the armored cavalry squadrons.

B. OBJECTIVE 2 - ARVN TACTICS AND TECHNIQUES

1. Formulation of Tactics for ARVN Armor Units

At the time of the evaluation, Armor Command and the Armor School did not have any formalized printed source of tactics or doctrine except the lesson plans used at the Armor School. Action has been initiated by Armor Command in conjunction with the Armor School to prepare and distribute to Armor ARVN units appropriate documents covering doctrine, tactics,

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organization, and materiel.

The Armor School mission, contained in annex B, did not specifically assign the school a responsibility for developing tactics but required that all types of armor instruction be provided to qualify armor officers and NCO's in their fields. In addition, refresher training and transition training in new equipment was provided armor units. Examination of the school POI and procedures revealed that lesson plans in some cases were direct translations from US Armor School lesson plans and there was no system for modifying tactics and techniques to fit the environment and operational needs in Vietnam. (See annex G.) The Infantry School officer courses included only 2 hours instruction on armor—1 hour on armor organization and 1 hour on the characteristics of armor vehicles. The lesson outlines and student summaries for the armor instruction presented to students at the RVNAF Command and General Staff College were reviewed and found to contain some inaccuracies with regard to organization and equipment of ARVN armor units and the routine planning and conduct of combined arms operations. For example, the keynote class in RVNAF Armor instruction, unit number 100, "Employment of Armor in Vietnam", described an M3 howitzer motor carrier which was not in use in RVNAF and referred to "Mechanized Rifle Troop, 5th Infantry Division", "Mechanized Rifle Troop, 23d Infantry Division", and "the armored reconnaissance company", none of which were in existence.

"But since the armor employment in Vietnam is not similar to those in other countries due to the difference in terrain features, the conventional mission of armor cannot possibly be adopted in this country" is another statement made in instruction unit number 100. According to US doctrine contained in FM 17-1, the armor mission for tanks is: "To close with and destroy enemy forces, using fire, maneuver, and shock effect in coordination with other arms" and for mechanized infantry: "To close with the enemy by means of fire and maneuver, and destroy or capture him, or repel his assault by fire, close combat, and counterattack." United States doctrine states further that the ground and air elements of armored cavalry are particularly well-suited as a combat counterinsurgency force in difficult terrain. It is true there are some places in Vietnam where M113's cannot go and some areas that are impassible for tanks but to teach such a negative view in the RVNAF senior service school is to discourage any attempts on the part of field commanders to make full use of the equipment available to them.

The initial unit of instruction on armor also stated, "It is realized that, with its basic missions, the armor is unable to help the troops effectively counter an enemy who appears at an unexpected time and at an unexpected place." In contrast with this, US doctrine on armor employment states, "The cross-country mobility, firepower, and communications of armor units allow the armor commander to rapidly mass or disperse his combat power for the accomplishment of any given task."

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Another statement contained in RVNAF instruction unit number 100 was, "The organization of the units for special missions is complex and technically and tactically difficult." In this regard US doctrine taken from FM 17-1 is, "Armor units, by virtue of their organization, extensive communication, mobility, and variety of weapons, are capable of rapid and frequent changes in organization, formation, and direction of movement."

In practice, the tactics and techniques of armor employment were developed independently within each ARVN armored cavalry squadron. The tactics and techniques were basically the sum of a unit's operational experience in its own area, influenced to varying degrees by the US advisors, teachings of US Service schools as interpreted by ARVN officers who had attended them, and teachings of RVNAF service schools. Needless to say, no two squadrons operated the same way, but appreciable differences would be expected because of the terrain differences. The 2nd Armored Cavalry on its own initiative prepared and published an SOP covering M113 operations in order to take advantage of lessons learned and provide guidance for its subordinate units. (See annex D.)

2. Tactics and Techniques used by ARVN Armor Units

The tactics and techniques of employing ARVN armor squadrons were simple and direct and from one engagement to the next showed little variation within the squadrons. Variation among the squadrons was greater, however, and depended more on the terrain and characteristics of the ARVN commanders than on the nature of the enemy opposition.

a. Mechanized Rifle Troop Tactics

The tactics and techniques of ARVN mechanized rifle troops were covered in great detail in the ACTIV report "Mechanized Rifle Troop (M113)", dated 25 June 1964, but typical practices found during the present evaluation will be discussed to identify established procedures as well as more recent trends.

The two mechanized rifle troops (3d and 4th Troops of the 4th Armored Cavalry Squadron) in I Corps were under operational control of the 1st and 2d Divisions, respectively, and each was employed differently. Because of the distances involved and the quick reaction capability that the division commander believed to be necessary in certain critical areas, the platoons of 3/4 Troop were located apart from one another and also employed separately. The overall loss of effectiveness and the increased vulnerability inherent in such piecemeal employment was apparently accepted by the division commander in order to be able to provide a responsive, though meager, armor reaction force. In the 2d Division, 4/4 Troop was employed as a whole troop in most cases. The division advisor stated that the division needed at least one more M113 troop and, that if tanks were available, combined arms teams could be employed. This troop, as did the platoons of 3/4 troop, employed a column formation when moving to the

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attack position and a line or wedge when crossing the LD, continuing either in that formation or in echelon to a position for an assault, and deploying on line for the assault when possible. Their tactics varied with the terrain but generally followed that of US mechanized infantry. The infantry remained mounted as long as possible, then dismounted at the last moment. Unless forced to move by road, this troop preferred to move cross-country.

There were more M113 troops employed in II Corps than in any other corps. The 3d Armored Cavalry Squadron had three organic M113 troops and one attached troop (2d Troop of the 6th Armored Cavalry Squadron) but, as was true in I Corps, all the M113 troops were under operational control of divisions or province chiefs during the evaluation. The tactics employed by the M113 troops in II Corps differed to some extent from those in other corps. For instance, 4/3 Troop was under operational control of a province chief who required that half of the troop remain at his headquarters at all times as a security force. The advisor to this unit stated that from 30 to 50 percent of the time the troop commander was not consulted on the employment of his troop and frequently never even got to see the operations order. The usual procedure was that the troop commander was given the coordinates where VC had been encountered and was ordered to move his troop to that location. Excessive distances between the base and operational areas was a problem for this troop and on occasion it had to move over 30 kilometers on reaction missions.

There were numerous instances in which the Vietnamese armor units used M113's more as tanks than as armored personnel carriers. The troops that did this usually manned the M113's with fewer than a normal crew, usually 5 to 7 men instead of 12 and would carry much more than a normal basic load of ammunition. With this arrangement, there were no riflemen to dismount and fight and the M113 became a fighting vehicle.

One example of effective route security was accomplished in II Corps by 3rd Troop of the 3rd Squadron when they had been included as a part of a larger force having the mission of securing a route. The role of the 3/3 Troop was that of a mobile reserve. Rather than patrol the road, the troop was stationed at selected central locations for several days each. (See annex E.)

Advisors from a majority of the squadrons reported unwillingness on the part of troop commanders to try new or different tactics, without authorization of their superiors.

The troop in Binh Dinh was used effectively as a whole troop after November 1964 and accounted for a VC body count of 65 during December 1964 and January 1965. It was ambushed at An Lao early in December and sustained 15 ARVN and 2 US casualties but because of quick replacement of the three damaged M113's and the assignment of two new platoon leaders, the morale and fighting spirit of that unit increased rather than decreased.

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after its ambush.

The troop in Phu Yen province was poorly used during the evaluation. The troop daily log book showed that since September 1964, it had been used as a complete troop only twice. In each of these cases it had only limited success, owing primarily to a lack of aggressiveness on the part of the force commander. The 3d Squadron advisor considered the squadron to be in need of additional training in the following techniques:

- 1) Ability to dismount, deploy, and control the riflemen. Along with this went the requirement for bringing the troops up to strength. Even though 90-odd riflemen were authorized, each troop averaged only 50 to 60 riflemen assigned.
- 2) Quick reaction assaults against heavy small arms fire. The troops needed to become proficient in a battle drill which capitalized on their armor protection and automatic weapons. Each platoon had two cupola-mounted caliber .30 machineguns. When the troop was employed as a unit, the six cupola-equipped M113's could assault with accurate fire while the remaining nine cars either maneuvered or served as a base of fire.
- 3) Quick reaction to, and aggressive assaults on, anti-tank weapons. Training was needed to emphasize respect for, but not fear of, such weapons and should have stressed the importance of pressing the attack rather than holding back or creeping cautiously in the face of known anti-tank weapons.
- 4) Effective use of 81mm mortars and 57mm recoilless rifles. As late as November 1964, some troops did not bother to take their mortars on operations, while by way of contrast, the troop in Binh Dinh used its mortars frequently and was able to dismount them and be ready to fire in 3 to 4 minutes.
- 5) Fire discipline, marksmanship, and conservation of ammunition. Most ARVN units had a tendency to fire great volumes of ammunition rather than employ the technique of well-aimed, observed fire. In long engagements this could have been disastrous or at best would have reduced the chances of a complete victory.
- 6) Refresher training was required in special operations and special equipment, such as gas masks, balk bridging, infrared devices, mine detection, demolitions, pneumatic boats, and life vests.

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The 1st Armored Cavalry Squadron, assigned to III Corps, differed from the other squadrons mainly in that one M113 troop (3/1 Troop) normally remained under squadron control as a part of the corps reserve. It was used frequently for security operations in the Dong Nai Sensitive Area and occasionally was attached to divisions, provinces, or special zones as required. The other two M113 troops were normally under operational control of the divisions: 2/1 Troop with the 25th Division, and 4/1 Troop with the 5th Division. The mechanized rifle troops of the 1st Squadron were generally employed as troops and not in platoons and sections. During the evaluation a trend to employ M113's in less than platoon size elements was noted in the 25th Division, where an apparent lack of understanding of effective infantry-armor employment led to attempts on the part of division to break the troop down into platoons, and platoons down to sections and even to individual vehicles, placing them on road blocks or to cover avenues of approach. The 25th Division made frequent use of 2/1 Troop but seldom consulted the troop commander on the most effective ways to employ his unit. Cross-reinforcement was not the general practice in III Corps. However, when the M113 troops operated with dismounted infantry, they moved together and from time to time the riflemen would ride on the APC's. When used together, they operated jointly yet semi-independently. It was reported that when 2/1 Troop was committed as a unit, rather than piecemeal, it functioned aggressively and effectively. This troop operated off the roads as much as possible and tried to have L19 air observation whenever it moved. Two M113 mounted flamethrowers (M132) were attached and accompanied the troop on most operations. These flamethrowers proved effective in reducing VC fortified positions, especially those heavily boobytrapped and located in dense undergrowth. The use of flamethrowers is discussed in the ACTIV report, "Annex B (Flamethrowers) to Addendum, Mechanized Rifle Troop (M113)", dated 25 August 1965.

There were two armored cavalry squadrons in IV Corps: the 2d Squadron, organic to the corps, and the 6th Squadron, under command of the Joint General Staff and placed under operational control of the 7th Division. The 6th Squadron had only three troops, all M113, one of which was attached to the 3d Squadron in II Corps. The two M113 troops remaining with the squadron alternated between Cai Lay and My Tho. The troop at Cai Lay had an ARVN infantry company attached and performed a road security mission. The troop at My Tho was on alert status as a division reaction force, normally under squadron control.

Two of the three 2d Squadron M113 troops, 3/2 Troop and 4/2 Troop, were under operational control of the 9th and 21st Divisions, respectively, and 2/2 Troop was normally under squadron command as corps reserve. Frequently, 2/2 Troop was placed under the operational control of divisions for specific operations. The M113 troops in this squadron were always employed as troops and the squadron and troop commanders were involved in planning operations.

Usually, 3/2 Troop was attached to an infantry regiment or

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battalion and was seldom used independently. It normally was reinforced with a company of dismounted infantry and employed as a maneuver force while a portion of the larger infantry force set up a base of fire, blocked, or attacked from another direction. Through efforts of both the armored cavalry advisors and the 9th Division advisors during the evaluation, this technique of cross-reinforcement became commonplace and noticeable increased the effectiveness of both the infantry and the APC units. On numerous occasions, by enveloping the enemy position, 3/2 troop was able to cut the escape route of the VC and catch them attempting to withdraw. By employing this technique, 3/2 Troop took full advantage of the mobility and fire power of the M113. However, neither this troop nor any of the others made effective use of artillery fire support.

The troop under operational control of the 21st Division (4/2 Troop) was habitually employed with an infantry unit and, whenever possible, infantry reconnaissance units organic to the division were attached to the M113 troop. In combination, these were elite units and worked well as a team. This M113 troop was used as a reaction force. On a typical search and clear operation wherein an M113 troop was part of a larger force under regimental or divisional control, the troop would likely make a blackout night move over a previously reconnoitered and secured road to a location where it would be joined by a dismounted rifle company. Usually 15 minutes would be sufficient for the infantry and the M113 unit to effect coordination and for the riflemen to mount the carriers. The blackout road march would then continue to within 10 kilometers of the LD. The distance remaining to the LD would be cross-country with the whole movement timed to reach and cross the LD at daylight. Cross-country routes were chosen to avoid as many stream and canal crossings as possible. Canals, being the most easily identifiable terrain features, were frequently chosen for LD's, in which case the infantry was normally sent across to provide security for the crossing of the M113's. Times for the entire troop to cross canals varied from 15 minutes to several hours, depending on the presence of trees or other heavy vegetation along the canal, the steepness and height of the banks, and the level of the tide. Crossings were easier when the tide was high, because at low tide expanses of muddy banks were exposed. When tide conditions and height of banks on canals indicate that the troop will have difficulty in crossing, canals should not be selected as LD's. Once across the LD, the troop with its mounted infantry would advance along its assigned axis using any of several formations, depending on visibility and fields of fire. In very open terrain the entire troop would most likely advance with the three mechanized rifle platoons on line, followed by the support platoon and troop headquarters. On occasion troop frontages were as much as 3500 meters. In terrain with poor visibility and shorter fields of fire the troop might advance with a column of platoons on-line. Frequently each platoon moved in an inverted V, with the platoon leader's M113 between and slightly behind the other two. In planned operations the controlling headquarters assigned one or more objectives to be searched or attacked. As the troop came within effective small arms range of the objective (hamlets or tree lines or

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patches of trees and undergrowth) they might at the discretion of the team commander reconnoiter by fire. At this distance, the carriers would stop while the riflemen dismounted and continued to the objective on foot. The carriers might or might not advance behind the riflemen or provide supporting fire, again according to the judgement of the team leader. Occasionally one or more platoons of M113's would be sent around the objective to forestall VC escape from the rear. The attached rifle company commander normally rode with the M113 troop commander and controlled his company when it was on foot by AN/PRC-10 radio communication with his dismounted platoon leaders.

b. Tank Troop Tactics

Three of the six ARVN armored cavalry squadrons had M24 light tanks. The 3d and 4th Squadrons had one troop (17 tanks) each and the 5th Squadron, all tank, had three troops. None of the tank units were employed as a troop in combat during the evaluation and only three operations of platoon-size were reported. Normally the tanks in the 4th Squadron were held in Da Nang as security for I Corps headquarters and for the airbase. On the few occasions the 4th Squadron tanks were employed, it was by platoons. It was reported that in July 1964 a platoon of M24's and a troop of M113's from the 4th Squadron were placed under operational control of a province chief to attack a fortified VC village northeast of Quang Tri. The tanks were employed as a blocking force while the APC troop assaulted the village. After the APC troop failed to carry the objective, the province chief was persuaded to let the tanks support the attack. They, in conjunction with the APC troop, succeeded in destroying much of the village by fire and the objective was taken.

Except for one platoon, the tank troop of the 3d Squadron was stationed in Pleiku (II Corps) where it served as security for corps headquarters and the airfield. The platoon not with the troop was stationed at Tan Chan and it averaged two or three operations a month providing security for the command post of the regiment it supported. There were no records of engagements however. The tank troop (-) in Pleiku served primarily as static security force for the corps headquarters and the airfield. As an example of their use, during the VC attack on Camp Holloway on 7 February 1965, the squadron reacted within 20 minutes in accordance with the local defense plan with five tanks and two M113's. However, as a result of a failure in communication with American defenders, the reaction force was delayed in route and failed to close with the VC.

In general, tanks in Vietnam were employed by platoon if they were employed at all. Their tactical formations were the same as used by US units, though they were roadbound in some areas. These tanks did not employ fire and movement but, rather, fire then movement. There was no known case during the evaluation in which either tanks or APC's had assaulted an objective under supporting artillery fire. After the data collection period, however, an armor task force consisting of a troop of

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M41 tanks, a troop of M113's, and varying amounts of infantry and artillery, all under the command of the 3d Armored Cavalry Squadron, operated successfully for approximately 3 months in the coastal plain and interior highlands of II Corps.

The advisor to the 1st Division stated that tank-infantry teams had not been employed in I CTZ in the past year, though in his opinion they could have done so and could have been used to good advantage. He believed the 1st Division area to be the best suited in I Corps for tank operations but considered the old M24's on hand at that time mechanically too unreliable to operate effectively. This was one of the reasons frequently given for the non-use of tank units.

Shortly after the evaluation the M-24 tanks were replaced by the M41A3 tanks. That the mechanical problem with the M24 was a valid consideration was borne out by the effective use of the tank-infantry-artillery task force employing M41A3's under control of the 3d Squadron in II Corps. Records at the Armor Command indicate that this TF engaged in 24 operations through November 1965.

c. Armored Car Tactics

There were 4 ARVN armored car troops, 1 located in each of the corps areas, and 45 Regional Force mechanized (armored car) platoons, 43 assigned to provinces and 2 assigned security missions at I Corps and IV Corps headquarters. The Regional Force mechanized (armored car) platoons consisted of a platoon headquarters with 2 armored cars and two combat sections with 2 armored cars per section for a total of 6 armored cars per platoon. (See annex C, C-6.) The ARVN armored cars were US made M3's, while the RF cars were the Ford Lynx and the GM15.

The ARVN armored cars in I Corps (2d Troop of the 4th Armored Cavalry Squadron) were employed primarily for road security and, except for support rendered to Da Nang Special Sector, were seldom used in other operations. When performing road security missions, sections of two or three cars, sometimes accompanied by truck-mounted ARVN infantry or Regional or Popular Forces, patrolled the main roads on an irregular schedule. On occasion they were used to relieve outposts under VC attack. In some of these instances they attacked off the roads with cars on line using machinegun fire and canister. In the Da Nang Special Sector armored cars were employed for linkup operations, reinforcing infantry units, sector patrol, and in the fire support role when the supported infantry attacked into areas in which the cars could not accompany them. If the terrain permitted, the car would lead the infantry in the attack. In terrain where this was not possible they supported by fire and provided flank and rear security.

In II Corps, the ARVN armored car troop (2d Troop of the 3d Armored Cavalry Squadron) was used entirely for convoy escort and security

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of province headquarters. Troop headquarters and one platoon were located in Kontum, one platoon in Pleiku, one platoon in Ban Ho Thot, and a three-car section in Phu Cat. These cars were kept in the province towns most of the time. They were included in supply and truck mounted troop columns from time to time for convoy security and were used to escort important military or government officials.

The Phuoc Binh Thanh Special Zone of III Corps had operational control of the armored cars (1st Troop of the 1st Armored Cavalry Squadron). Here also the armored cars were used solely for convoy escort and route security. Convoy escort was primarily for commercial rubber shipments and military supplies along route 13. For all practical purposes the armored cars were road bound because of the terrain. The troop headquarters was at Chon Thanh and platoons were at Chon Thanh, Dong Xoi, and Phuoc Vinh. The platoons were normally employed separately, although the troop on occasion was assembled for large convoy escort operations.

The ARVN armored car troop in IV Corps (1st Troop of the 2d Armored Cavalry Squadron) was used extensively for convoy escort and route security on all main roads throughout the corps except in the 7th Division area. The troop headquarters, one car section from the 3d Platoon, and the car section from squadron headquarters troop were located at Vinh Long and conducted road patrols and convoy escort. These sections also conducted night patrols with considerable success. The number of mining and sniping incidents along the roads patrolled were appreciably reduced following initiation of the patrols. On the occasions when armored cars were employed at night they were always accompanied by infantry. The remainder of 1/2 Troop was deployed as follows: 1st Platoon minus one section in Can Tho, 2d Platoon minus one section in Sadeo, 3d Platoon minus one section in Bac Lieu, one section of the 2d Platoon in Tra Vinh, one section each of the 1st and 2d Platoons in Rach Gia. The armored car unit at each of these locations was under operational control of the senior local military or civil official. The Kien Giang province advisor stationed at Rach Gia stated that the two sections of ARVN armored cars plus a Regional Force armored car platoon were under the operational control of the Province Chief. They were used primarily to keep the roads open and for convoy escort.

The armored car platoons of the Regional Forces, though equipped with the older Ford Lynx and GML5 vehicles, were used in the same manner as the ARVN units equipped with obsolete US MB's. Both the ARVN and RF armored car units were over-committed in most cases, owing both to the dilapidated condition of the vehicles and lack of sufficient vehicles for the extensive day and night patrolling expected.

3. Employment of Organic Units by ARVN Armored Cavalry Squadron Commanders

Because of dispersal, the squadron commanders did not have the

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opportunity to control their whole squadrons. In the 2d and 6th Squadrons, however, they did have operational control of portions of their squadrons as well as attached or supporting units. Both squadrons in the delta were frequently used and their missions were usually to serve as a maneuver, or a wide-sweeping, force in conjunction with dismounted infantry. Typical operations involving the 2d and 6th Squadrons are described in annex E. The commander of the 2d Squadron had ready access to the corps commander and was consulted frequently by the corps staff regarding the employment of the squadron. The single operation of the 2d Squadron during the evaluation was as a reaction force in which the squadron had under its command little more than a company. No contact was made with the VC.

4. Employment of Armored Cavalry Squadrons by the ARVN Corps Commanders

During the evaluation the corps commanders did not employ their organic armored cavalry squadrons as integral units but chose instead to split them up. Armored car troops were broken down into elements as small as sections and placed under operational control of divisions, regiments, special sectors, and provinces. Mechanized rifle troops were usually placed under operational control of divisions and tank troops were assigned headquarters and airfield static security roles. The squadron headquarters provided administration, maintenance, and logistical support for their widely separated units. On a few occasions the squadron headquarters were used by the corps to control special task forces of less than regimental size. During the evaluation the 1st and 3d Squadrons controlled one, the 2d Squadron controlled eight, the 4th controlled two, the 5th did not control any and the 6th Squadron controlled four operations. The ARVN armored cavalry squadron headquarters were reported to be as capable as an infantry regimental headquarters in planning and controlling combined arms operations. This was so by virtue of grade and training of the staff, organic mobility, and availability of multiple and flexible communications means. In view of the non-use of the 1st, 3d, 4th, and 5th Squadron headquarters in planning and controlling operations, their effectiveness in this role was questionable. Both the 2d and 6th Squadron commanders and their US advisors, however, were involved in planning operations involving the armor units.

Since the period of the evaluation a combined arms task force has operated in the II Corps area. Its composition was, usually, Hq 3rd Armored Cavalry 2/3 tank troop, one troop of M113's, one battery of artillery, and one battalion of Rangers. In August 1965 the task force opened highway 19 from Qui Nhon to Pleiku, keeping it open long enough for a number of large convoys to resupply Pleiku. In September 1965 the task force was used to relieve Plei Me. These operations indicate that with proper training and experience armored cavalry squadrons can command and control attachments of at least two battalion-size units.

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5. Comparison of ARVN Armor Employment with US Doctrine

The most appropriate US doctrine for the employment of armor in counterinsurgency is contained in FM 16-1, Armor Operations.

United States doctrine holds that the particular environment in which operations are being conducted will dictate the most effective armor force to employ against the irregular force. With the exception of the 2d and 6th Squadrons, the armored cavalry squadrons had no significant attempts to adjust their structures to better adapt them to the conditions of terrain that prevailed in each area. Several US advisors reported a lack of success in getting ARVN squadron and troop commanders to tailor their force to fit the mission and terrain. Where armored units and infantry units were employed together, more often than not it was a cooperative effort rather than a coordinated effort. Unity of command, so essential for success when employing cross-reinforced units, did not exist as understood by Americans. In most cases ARVN commanders were unwilling to experiment with new tactics and various combinations of the combat units available to them. According to US doctrine, these operations should make maximum use of small, highly mobile, combined arms task forces that could find, fix, fight, and destroy irregular forces. Combat units should be from company to battalion size, have a single commander, and be composed of various combinations of armored vehicles possessing heavy firepower, of standard dismounted infantry, and of troops equipped to provide indirect fire support. In the case of the 2d and 6th Squadrons, this was done, but they did not strive in many cases to fix and destroy the VC when they were capable of doing so. More often than not the ARVN failure to fix and destroy the VC was because the VC unit had not been completely surrounded and were usually permitted to break contact and withdraw at will.

The ARVN used armor to provide protected communications, mobile road blocks, protected supply and evacuation, and convoy escort in accordance with US doctrine.

The Vietnamese had no armored cavalry units in the US meaning of the term, i.e., lightly armored highly mobile units having a combined arms team organization at the platoon level that were equipped with a high proportion of automatic weapons and radios. Though the 1st through 4th Squadrons had sufficient equipment and personnel, they were not organized like nor did they operate like US armored cavalry units. Combined arms operations under a single commander were the exception rather than the rule. When dismounted infantry and MLB units operated together it was ARVN practice not to designate a single commander for the operation as is considered necessary in US operations of this type. There were occasions reported in which component unit commander declined to "participate" in attacks because they felt their unit was not being employed properly. Unity of command, except at division or corps level, was not common in the employment of combined arms teams.

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In offensive action against guerrilla forces, US doctrine holds that once surrounded, such forces are destroyed by continuous attack. Frequently, ARVN units, armor as well as infantry, would stop pressing the attack at dark, even when they had the VC surrounded and outnumbered. This gave the VC the opportunity to find gaps in the encircling force and exfiltrate during the night.

The types of offensive action best employed against irregular forces, according to US doctrine, are encirclement, attack, and pursuit. As brought out above, encirclement and pursuit were generally not effectively carried out by ARVN units. All too often ARVN forces would drive the VC from their positions and then forfeit a real victory by failing to pursue the exposed and disorganized enemy. There were numerous instances wherein mechanized units were available and capable of pursuit, yet higher command ordered them to remain on the objective. The reason suggested was that they chose a terrain objective rather than the destruction of the VC force.

United States doctrine propounds the use of composite forces whose elements will vary with the geographic area. Generally the nucleus of these tailored forces is the armored cavalry unit, reinforced as needed. Mechanized infantry battalions may also be used to form fast, mobile, hard hitting task forces. In each case, indirect fire support, engineers, and other support units needed in the given area are included as a part of the task force. The Vietnamese never used as much as a mechanized battalion-size unit in a tailored force, though the 2d and 6th Squadrons on occasion served as task forces, using two M113 troops and reinforcing infantry. Normally, artillery was not a part of these task forces. However, 81mm mortars were organic to each M113 troop and during the evaluation, a test self-propelled 4.2-inch mortar platoon operated with the 2d and 6th Squadrons. Tactical air support was plentiful and used freely, even to excess. There were occasions when artillery fire would have been more effective. Rarely did ARVN employ artillery and air on the same objective, either simultaneously or in close succession. There were no reported cases of ARVN using supporting fires to cover the advance or movement of their assault force. Rather than fire and movement, it was fire followed by movement. Judging from the massive air strikes and the frontal assault pattern of ARVN operations, it seemed that fire was considered as a substitute for maneuver.

According to US doctrine, great reliance is placed on combat patrols, road blocks, raids, ambushes, and pursuit actions until such time as the insurgent forces can be contained. These types of operations against insurgent forces were also stressed by ARVN armor, except for pursuit. It would, of course, usually be inappropriate to employ armor ambushes against dismounted insurgents.

Initial decentralized control of artillery in support of a wide-spread operation is held by US doctrine to be necessary. Although artillery

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itself was decentralized (in fact, fragmented), control was not. The authority to fire was usually held at a relatively high level, so that fires which were not pre-planned were often delayed and in many cases were never obtained at all.

In the area of administrative support, ARVN armor techniques, though different in detail and degree, were much in agreement with US techniques. Both US and ARVN armor practice included the use of protected convoys for supplies and medical evacuation, with emphasis on air resupply and air medical evacuation.

Probably the greatest difference in ARVN and US doctrine was in the area of command relationships. In the case of ARVN armor units there appeared to be two items of consequence: one item reported by advisors had to do with order of rank and "face", and the other item was the inordinate influence Armor Command exercised on armor units. The first item was common to all branches of ARVN and the second seemed to stem from the relationship of all armor units to the Armor Command. With respect to the first item, freedom of action and initiative exercised by commanders was proportionate to level of command. Once an order was issued and an operation was in progress, company and troop commanders were, or felt, obliged to follow the order quite literally. Should the VC have reacted in an unforeseen manner or should opportunities for exploiting success have developed, the commander on the ground would almost never assume responsibility for a change in the plan. This situation was further aggravated by commanders having the authority to make such changes in the battle plan being located at some distance from the action. There were several notable exceptions to the general lack of initiative taken by troop level commanders. One outstanding case was that of 4th Troop of the 2d Armored Cavalry Squadron. The commander of that troop actively commanded his unit and he was successful time after time in combat. He enjoyed the confidence of his men, his squadron commander, and the commanders of units he supported. One senior US observer attributed that troop commander's success to his training. Having been a student in several courses at the US Armor School he was well versed in conventional armor employment and because of his demonstrated knowledge and ability he was permitted more freedom of action than most troop commanders. In most other units, however, there were many cases wherein the VC were permitted to escape or were not engaged at all because the commander was unwilling to take the action which would have resulted in maximum damage to the VC. Sometimes, either on his own or at the urging of an American advisor, the commander at the critical location would request permission to deviate from the plan only to have his request denied. The loss of face suffered thereby would make him reluctant to offer unsolicited recommendations to his superiors in the future.

The second aspect, as stated above, had to do with the inordinate influence Armor Command exercised on armor units. Even though the armored cavalry squadrons were attached to divisions or regiments, it was not uncommon for troop commanders to elect not to carry out the orders of the

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commander to whom they were attached or to refrain from offering suggestions and advice on the most effective use of their troops. They did the former at some peril, but the commanders of units to which they were attached were reluctant to take action because of their lack of authority over armor officers. When these two factors, the lack of freedom of action for the commander on the ground and the influence of Armor Command that transcended normal command channels occurred together, the results could be tragic from an American point of view. As a case in point, a reinforced battalion search and destroy operation conducted in III Corps during the evaluation (account given in annex E), illustrates both the lack of initiative not uncommon with commanders and the authority of Armor Command over armor field units which inhibited command by the field commander over the attached armor units.

6. Findings

- a. Vietnamese tank units were not effectively employed during the evaluation.
- b. Vietnamese armored car units were employed by platoon and section in the convoy escort and route security role.
- c. Vietnamese M113 troops operated in tactical formations similar to those taught US mechanized infantry units but their tactics varied among the corps.
- d. The majority of the ARVN armor units employed their M113's as armored fighting vehicles rather than as mechanized infantry carriers.
- e. Neither the ARVN Armor Command nor the Armor School provided appropriate armor doctrine or tactics for armor units.
- f. Armor instruction presented at the RVNAF Command and General Staff College contained inaccurate information concerning ARVN organization and equipment and incorrect information regarding the employment of armor.
- g. Army of the Republic of Vietnam commanders did not normally cross-reinforce units to perform specific missions.
- h. Vietnamese armor troop and squadron commanders were unwilling to experiment with tactics and techniques.
- i. Vietnamese armor units did not usually employ fire and maneuver in their attacks.
- j. When ARVN armor and infantry units operated together, a single overall commander was usually not designated.
- k. Vietnamese armor did not attack or maneuver while supporting

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artillery fire and air strikes were being placed on the objective.

l. Vietnamese armor units did not attack while moving under GPF-fused overhead artillery fire.

m. Vietnamese Army units did not usually pursue when they forced the VC from positions.

n. Vietnamese armor units normally attacked frontally.

o. The Vietnamese did not usually employ the armored cavalry squadron as a unit.

p. Only two of the six ARVN armored cavalry squadrons were used as tactical control headquarters.

q. In many cases attacking ARVN units had as their objective the seizure of terrain rather than the destruction of the enemy force.

r. Vietnamese armor employment differed from US doctrine for employing armor in counterinsurgency in the following areas:

- 1) Use of task forces tailored to fit the mission and terrain
- 2) Unity of command
- 3) Encirclement and pursuit
- 4) Continuous attack to completely destroy the enemy once located
- 5) Decentralized control of artillery during widely scattered operations

C. OBJECTIVE 3 - ENEMY TACTICS, TECHNIQUES, AND WEAPONS

1. Viet Cong Armor Defeating Weapons

During the evaluation the VC employed the following anti-armor weapons against ARVN armored vehicles:

- a) 57mm recoilless rifles
- b) 75mm recoilless rifles
- c) Anti-tank hand grenades (various types)
- d) Mines, pressure and electrically detonated (various types)

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e) 82mm Russian RPG-2 anti-tank rockets

All of the above listed HEAT weapons (except grenades) are capable of penetrating both the M113 and M41 tank if they strike at an appropriate angle. They do not, however, accomplish complete destruction of the vehicles unless secondary explosions of fuel or ammunition result. Characteristics and capabilities of these weapons are shown in annex F.

The weapons most commonly used against ARVN armored vehicles were 57mm recoilless rifles and mines. No unit reported having vehicles hit by 75mm recoilless rifle fire but VC units operating in RVN were known to have these weapons and several ARVN armor units reported capturing 75mm recoilless rifle ammunition. Moreover, the project officers examined destroyed M113's in the RVNAF 80th Ordnance salvage yard and found several with what appeared to be penetrations caused by 75mm HEAT rounds. The damage to these particular vehicles could not be associated with any specific unit or time frame. Mines accounted for more vehicles damaged or destroyed than did recoilless rifles, as shown in figure 4. In some cases vehicles were damaged or destroyed by both mines and recoilless rifles. Records kept in the 4th Squadron did not distinguish between the two.

There were no reports of serious damage to vehicles by anti-tank grenades, though grenades thrown into vehicles contributed to their

ARVN Unit	Vehicle	RR	Damaged		RR	Destroyed	
			Mines	Both		Mines	Both
1st Sqn	M8		4				
	M113			5	5*	5	
2d Sqn	M8		3			1	
	M113	2	2			1	
3d Sqn	M113	1	4		3		
4th Sqn	M8			3			1
	M113			16			1
	M24			6			
5th Sqn	M24			5			
6th Sqn	M113	6	2			3	
Total		9	15	35	8	10	2

(U) FIGURE 4. Armored vehicle combat losses, 1964.

*One M113 was destroyed by 75mm gun fire from a Cambodian M24 tank 75mm gun.

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destruction after the vehicles had been immobilized by either mines or recoilless rifle fire. The 57mm HE round would not normally penetrate the armor of an M113. The 57mm HEAT round would easily penetrate the M113 but, unless it hit either the fuel cell or power train, the vehicle was usually not put out of action. Since there is little spall and fragmentation from the aluminum armor of the M113, personnel or material outside the path of the shaped charge jet were uninjured or undamaged. The vehicle remained in operation in most cases other than fuel tanks hit by 57mm recoilless HEAT rounds. A hit on the fuel cell of the M113 invariably started a fire which completely gutted the vehicle.

The VC employed a variety of mines, some home-made and some standard military anti-tank mines, which used both pressure and electrical detonating systems. It was reported by MACV J2 that the VC used 75mm recoilless rifles more in the indirect fire role than as a direct fire weapon. There was no record that a 75mm HEAT round had ever been captured.

2. VC Employment of Anti-Armor Capability

The Viet Cong regional and provincial forces had armor defeating weapons employed as low as company level. Each main force regiment had a heavy weapons battalion equipped with twelve 75mm recoilless rifles and six to nine caliber .50 machineguns. The three to five rifle battalions in a regiment were each organized with a heavy weapons company equipped with two to four 75mm recoilless rifles and four to six caliber .50 machineguns and each rifle company had a weapons platoon with one or two 57mm recoilless rifles. The local, militia-type VC units frequently had no armor defeating weapons and were incapable of effectively engaging armor units. The VC were very skillful in locating defensive positions to afford vehicles few if any routes of approach. In these positions the VC sited their recoilless rifles to place flanking fire on the approaching vehicles, which usually resulted in the recoilless rifles being located on the flanks of the VC position.

The VC employed two general types of ambushes: linear and in depth. The linear formation was usually a single tactical unit deployed along a road or defile, in which case the recoilless rifles were most often found at each end of the ambush position. The formation in depth usually consisted of multiple units deployed in the proximity of likely avenues of approach. This formation was used when the ARVN unit was not restricted to roads and frequently involved more than a company-size VC force. An example of the exceptionally effective use of recoilless rifle fire by the VC occurred on 18 December 1964 when a troop of the 1st Armored Cavalry Squadron lost eight M113's within a period of 40 minutes. As the troop moved along a road through a rubber plantation, the VC suddenly placed heavy small arms fire on the column from a position 200 to 300 yards left of the road. The troop reacted quickly and attacked the VC position by moving on line down the rows of rubber trees. This maneuver placed each vehicle in a lane from which it could not easily turn. As soon as the

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troop had deployed in this manner, another VC force concealed close by the right side of the road opened fire with recoilless rifles and small arms on the rear of the M113 formation and damaged or destroyed eight of the carriers.

With the exception of the 3d Squadron all armor units reported that the VC had a pattern to anti-armor tactics. The 1st Squadron reported that any unit returning from an operation over the same route used in moving to the operational area would be subjected to electrically detonated mines. For example, in the year preceeding the evaluation, large anti-tank mines had been detonated on every road leading into the town of Due Hoa, Ham Nghi Province. Bridge approaches and defiles, as those on route 13 near Ben Cat, were consistently mined. The III Corps G2 advisor stated that the VC in his area made use of small arms fire and mines either to draw or channelize the carriers into areas where pre-positioned recoilless rifles could bring flanking fire to bear. However, as a general rule, the VC were unwilling to engage M113's except in carefully planned, well-prepared ambushes. The 2d Squadron also reported a VC penchant for mining routes the APC troops were likely to take in returning from operations. The 21st Division senior advisor stated that the VC would usually locate their recoilless rifles on the flank of an area through which the attacking force would have to move. He also said that the VC normally carried 6 to 8 rounds of 75mm ammunition and 8 to 10 rounds of 57mm for each weapon. By April 1965 the VC had started using the RPG-2 82mm anti-tank rocket. This weapon had a rated steel armor penetration of 7 inches but a hit nearly perpendicular to the side of an M113 failed to put the APC out of action, though it killed one of the crew and blew a 3-inch diameter hole in the aluminum armor. Even though the 3d Squadron reported no pattern in VC tactics, it did observe that the VC would frequently fire two rounds quickly then either move the recoilless rifle to another position or withdraw completely. The 5th Squadron noted that the VC usually placed their recoilless rifles near their flanks. The 6th Squadron observed that the VC usually employed their recoilless rifles in fortified tree lines and that they had a proclivity for electrically detonating mines under main roads. The 7th Division Deputy senior advisor stated that the largest groups of VC encountered by 7th Division units in his area were battalion-size groups (three or four companies) and then only when ARVN units were able to cut escape routes and force the VC to fight. No overall pattern could be established for the range at which the VC opened fire. The range for engagement varied with the type of action, i.e., VC ambush or ARVN attack on a VC fortified position, or with the terrain. There were no cases reported of the VC firing their anti-armor weapons at ranges greater than the effective range of the weapon. They apparently preferred to wait for the armored vehicles to get close enough for a sure hit. The ranges at which the VC opened fire on ARVN squadrons are shown in figure 5.

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<u>ARVN Unit</u>	<u>Opening Range (in meters)</u>
1st Squadron	75 to 300
2d Squadron	200 to 400
3d Squadron	10 to 300
4th Squadron	200 to 250
5th Squadron	50 to 100
6th Squadron	Less than 1000

(U) FIGURE 5. Ranges at which VC opened fire on ARVN units.

3. Effectiveness of VC Anti-Armor Tactics

Intelligence reports based on interrogation of captured VC and those voluntarily returning to government control revealed that the VC feared ARVN armor. The squadrons reported that the VC would attempt to avoid engagement with APC's if possible unless they had selected the battle site and carefully prepared their defenses or ambush. Continued effective operation of ARVN armor units indicated that the VC anti-armor tactics were not successful in denying ARVN freedom of action. The VC operations were not, however, without appreciable effect. In 1964, the VC damaged or destroyed 79 ARVN tanks, APC's, and armored cars. Though all units did not keep complete records of casualties or their causes, it was reported by advisors that mines caused more deaths and injuries to personnel riding in armored vehicles than did recoilless rifles. Casualties suffered during 1964 by three of the squadrons that were able to provide these data are shown in Figure 6.

	<u>KIA</u>	<u>MIA</u>	<u>MIA</u>
1st Squadron	42	143	7
2d Squadron	27	70	0
3d Squadron	27	92	0

(C) FIGURE 6. Armor personnel casualties, 1964.

4. Findings

a. Anti-armor weapons were organic to company-size and larger VC units.

b. When the VC engaged ARVN armored vehicles with recoilless rifles or rocket launchers, they attempted to deliver fires against the sides or the rear of the vehicles.

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c. The VC made effective use of terrain and man-made obstacles to channelize the ARVN armor vehicles.

d. Typically, the VC did not open fire with anti-armor weapons until the vehicles were within a range of 400 meters or less.

e. The armor defeating weapons most frequently employed by the VC were 57mm recoilless rifles, mines, and the Russian RPG-2 anti-tank rocket.

f. The majority of ARVN armored vehicle losses were caused by mines and 57mm recoilless rifles. Mines accounted for a greater proportion than the recoilless rifles.

D. OBJECTIVE 4 - INFLUENCE OF PHYSICAL ENVIRONMENT

1. Effects of Terrain and Weather on Armor Operations

The topography of South Vietnam consists of the following four types of terrain:

- a) Delta area, which included all of IV and the southern part of III Corps
- b) Coastal plain, located in I and II Corps and the northern part of III Corps
- c) Mountain and plateau regions, which included most of II Corps, and a large portion of I and III Corps
- d) Jungles and rubber plantations, mostly in III Corps, though II Corps had some

Though a more detailed discussion of the terrain and weather of the Republic of Vietnam is included in annex A, the specific effects of each on armor operations in the four areas are presented here.

The terrain in the delta effectively precluded the use of M24 tanks and armored cars off the roads in the wet season and in all but a very few areas during the dry season. Tanks were further restricted in all areas by the lack of bridges strong enough to permit them to cross. The only roads in the 7th Division area, for example, that could be used by tanks were the My Tho-Saigon road and the My Tho-Vinh Long road. Even so, there were bridges on both that were too narrow and weak even for light tanks. Advisors in three of the four corps areas stated that an armored vehicle launched bridge (AVLB) could have been used to good advantage during the dry season.

The M113's were able to operate cross country in almost all parts of the delta during the dry season. Dry rice paddies afforded good

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trafficability and allowed APC troops to maneuver freely at speeds up to 15 miles per hour from January to May. Obstacles to the M113's in the delta were canals and streams, heavy growths of swamp grass in the Plain of Reeds, mangrove swamps along the coast, and scattered palm groves or dense jungle growth. Paragraph III of the 2d Armored Cavalry Squadron M113 Operations SOP (annex D) describes the movement capabilities for APC units in the delta. The advisors of the armor units in the delta stated that the terrain alone dictated where the M113's could or could not be employed, and that map and aerial reconnaissance were absolutely necessary before any operation. While terrain did limit operations in the delta, the M113 could be effectively employed when proper consideration was given to experience, seasonal changes, and the tide.

The trafficability was considerably reduced even for the M113's during the wet season. Use of M113's then was governed by the depth of the water, composition of the bottom, and steepness of banks. If the water was deep enough, M113's could swim with no difficulty and in shallow water they had no trouble if the bottom was firm, but a very soft muddy bottom, such as existed in many canals, was not negotiable. For this reason, it was preferable to cross such barriers at high tide, so as to have as little mud to cross as possible. With a normal change in water level of 6 to 10 feet the tidal flow became a major consideration in armor operations of the delta. It was reported by the 2d Squadron Commander that the difference in high and low tide affected the crossing times by as much as several hours at a given crossing site. For this reason sites had to be selected carefully so as to reduce the number of crossings and to take advantage of the high tide. In the western part of the III Corps area there were lowlands that became inundated during the wet season but could still be crossed. Wells and sump holes, however, were a major hazard. In the dry season these could be seen and avoided, but this was not always possible in the wet season. Repeated travel across one spot would sometimes break the crust and the M113 would become stuck in the soft mud underneath. It was found in 1st Squadron operations in III Corps that APC troops could not operate as effectively in the jungle or in mature rubber plantations as in the open delta areas. In close vegetation the APC's lost their mobility and fields of fire and required additional dismounted infantry for close-in protection. In such terrain an infantry unit operated more effectively than the armored units.

In the coastal areas both M113's and tanks could be employed, though tank movement was restricted by unfordable streams and canals and by narrow and weak bridges. In the wet season cross-country movement was reduced for tanks and the rate of movement of the M113's was reduced. In contrast to the tanks, the armored cars could cross most of the bridges and, since the armored cars were essentially roadbound, their operations were not seriously hampered by the wet season. The 3d Squadron advisor stated that in spite of the bridge and stream restrictions mentioned above, tanks could have been employed in the coastal regions of II Corps near the cities of Qui Nhon, Tuy Hoa, Nha Trang, Phan Rang, Phan

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Thiet, and Ham Than.

The mountains were almost inaccessible to ground vehicles because of lack of roads, steepness of slopes, and presence of thick vegetation. In any event, no units attempted to employ armored vehicles in the mountains. The plateau area in the vicinity of Ban Me Thuot, Pleiku, Kontum, and An Khe was trafficable by tanks and APC's in dry weather and, to a lesser degree, in wet weather. As previously mentioned, the armored cars were roadbound and the weather had little effect on their convoy escort duties. With prior route reconnaissance, cross-country movement by tanks in the plateau region would have been possible. The rolling terrain in this area was compartmented by steep valleys and small streams but many fords were available and routes could have been selected to avoid crossing the streams. In some areas a dense growth of scrub trees and bushes hampered movement, especially for the M113's. Observation also was difficult. In such areas, air observation and additional dismounted infantry were needed for security and for assistance in selecting routes. Though little use was made of armored formations in the plateau region before and during the evaluation, a combined arms force of M41A3 tanks, APC's, dismounted infantry, and artillery was successfully employed subsequent to the evaluation.

Operations in the jungle areas usually were better conducted by dismounted infantry, though on several occasions both M113's and tanks of the 1st and 5th Squadrons were employed, but without success. The jungle was generally too thick for M113's to negotiate and movement was restricted to the existing tracks and trails. Visibility was seriously restricted and lateral communication routes were almost non-existent. Movement was by column formation only. Armored vehicles under these circumstances were especially vulnerable to attack by mines and anti-tank weapons at short range. To a large extent the same thing was true of operations in the extensive rubber plantations in the III Corps area. Visibility was somewhat better in rubber plantations than the jungle but mobility was still quite restricted. The trees were planted a standard distance apart which was just slightly greater than the width of an M113 and the APC's therefore had to follow the lanes and diagonals. A mature rubber tree was too strong for an M113 to push over, so changing direction once committed in a rubber plantation was most difficult.

2. Findings

a. In the delta, M24 tanks were restricted to the main roads during the wet season and to secondary roads or trails with limited cross-country movement during the dry season.

b. In the coastal plains M24 tanks could operate off roads to a limited degree in the wet season and to a greater degree during the dry season but unfordable streams and canals were obstacles during both seasons.

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c. In the central plateau region the terrain permitted cross-country operation of armor units in all seasons.

d. Because of Vietnamese tactics for employing armored cars in the convoy escort and route security role, variations in terrain had little effect on armored car operations.

e. Cross-country movement of tanks and armored personnel carriers could not be made in the mountains.

f. The visibility from and mobility of tanks and armored personnel carriers in the jungles and in rubber plantations were limited.

E. OBJECTIVE 5 - ORGANIZATION, EQUIPMENT, AND COMPOSITION OF UNITS

1. Organization and Personnel Strength

The organization of armored cavalry squadrons, armored headquarters troops, tank troops, armored car troops, mechanized rifle troops, and RF armored car platoons are shown in annex C. The authorized strength and the assigned strength for these ARVN units for March and April 1965 are shown in figure 7. The headquarters and headquarters troop of the 6th Armored Cavalry Squadron was organized under a reduced TOE, TG-131/A, which had 81 fewer spaces than the standard TOE, TG-31. The headquarters tank section was eliminated and the remaining cuts were taken across the board from all sections and platoons. The percentages of authorized strength shown in figure 8 for squadrons, headquarters troops, and combat troops indicate that the squadrons were at almost 90 percent of authorized strength but the headquarters, at nearly 100 percent, were usually being favored at the expense of combat units. Squadron understrength was reported as the reason for not dismounting riflemen to fight as mechanized infantry. The understrength in mechanized rifle troops varied from 11 to 50 men, with the average understrength 26 men, or approximately a rifle platoon per troop.

Of the 42 RF mechanized (armor car) platoons in existence in RVN during March and April 1965, 33 were at greater than 70 percent of their authorized strength of 42 officers and men. It was reported by an advisor to the RVN RF/PF headquarters that understrength in RF/PF armored car platoons was indicative of a shortage of operable armored cars rather than a shortage of personnel, in as much as it was RF/PF policy to transfer crews of unrepairable armored cars to RF/PF rifle units. Figure 9 shows the strength distribution of RF armored car platoons.

The RVNAF Armor School, co-located with the RVNAF Infantry School at Thu Duc, was staffed to handle 150 students, but the average student load in the year preceding the evaluation had been 378, with a maximum student load of 778. The Commander of the Armor School was also the commander of ARVN Armor Command and commander of the 5th Armored Cavalry

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	Hq Troop	Tail Troop	Tank Troop	Tank Troop	Armored Cav Troop	M113 Troop	M113 Troop	M113 Troop	Total
Authorized:	217	136	136	136	131	198	198	198	—
1st Sqn	268	—	—	—	112	160	180	166	1072
2nd Sqn	224	—	—	—	127	186	175	181	893
3d Sqn	445*	118	—	—	105	179	155	148	1150*
4th Sqn	221	119	—	—	118	117	169	—	814
5th Sqn	203	102	99	103	—	—	—	—	509
6th Sqn	127**	—	—	—	—	162	151	168	608

*Includes 333 enlisted fillers received April 1965.

**Hq Trp, 6th Sqn, organized under TOE TG-131/A, a reduced version of the standard TOE TG-131.

(C) FIGURE 7. Assigned strength of ARVN armored units, March and April 1965.

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	<u>1st</u> <u>Sqn</u>	<u>2nd</u> <u>Sqn</u>	<u>3rd</u> <u>Sqn</u>	<u>4th</u> <u>Sqn</u>	<u>5th</u> <u>Sqn</u>	<u>6th</u> <u>Sqn</u>
Hq Trp	124	103	52	102	94	93
Combt Trps	86	92	73	89	74	81
Sqn Total	92	94	70*	92	81	83

(C) FIGURE 8. Percentage of authorized strength by squadron, March and April 1965.

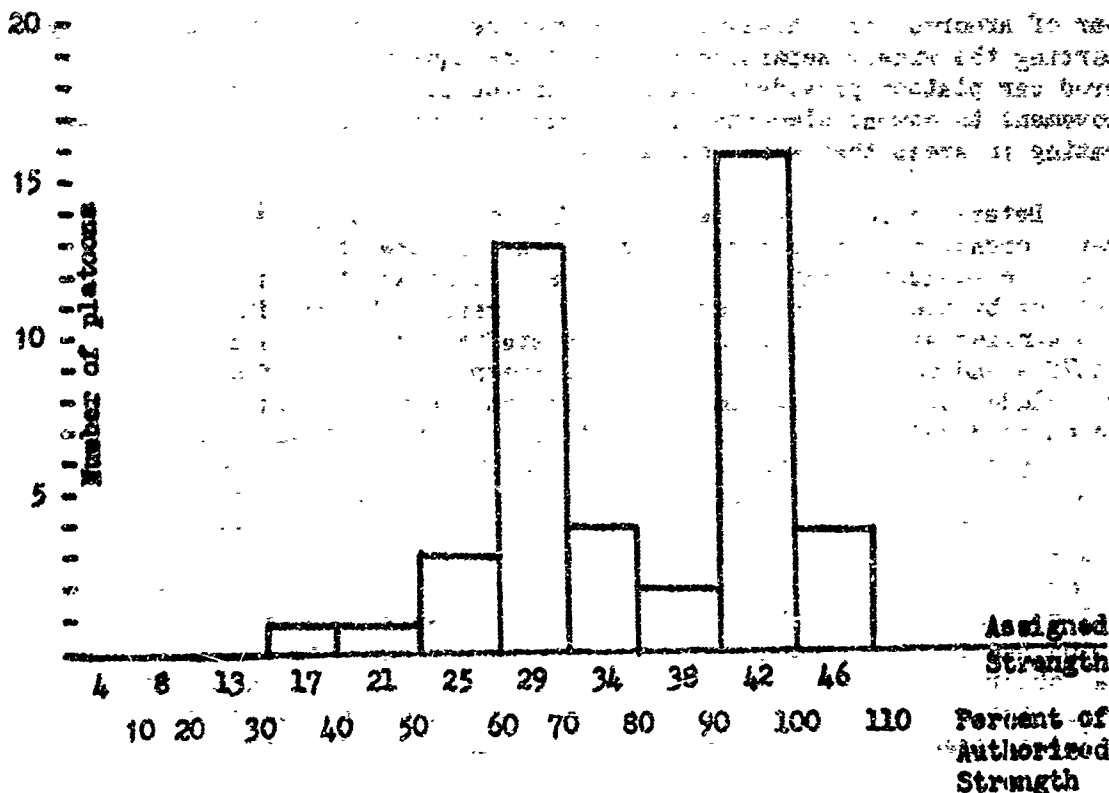
Squadron. At the time of the evaluation the school was authorized 38 staff officers and 67 faculty officers (instructors or supervisors). The school actually had 76 staff assigned and 72 staff attached, and 39 faculty assigned and 26 faculty attached, which gave a total of 148 staff (111 over TOE) and 65 faculty (2 short of TOE). There was no apparent operational reason for this imbalance of strength. After the data collection period the overstrength in the Armor School was reduced and the imbalance between the staff and the faculty eliminated. According to the US advisor to the Armor School there had been a harmful turn-over in key personnel during the 7 months preceding the evaluation when there were three different school commandants, two deputy commandants, four directors of instruction, three chiefs of tactics, two chiefs of automotive, and three chiefs of general subjects. It was reported by the US advisor to the school that 30 to 60 days were usually required for a new man to learn one of these jobs. Following the March 1965 coup a good portion of the Armor School personnel and the armor units then in training were moved to Ba Ria and ordered to conduct training there. After about 2 weeks they were moved back to the RVNAF school center and US advisors estimated a loss of 4 to 6 weeks training as a result.

The Armor School at Thu Duc had adequate classrooms, firing ranges, and training areas immediately available. It shared with the Infantry School 11 individual and crew-served weapon ranges including ranges for 57mm recoilless rifles and 81mm mortars. There was also a rifle platoon combat firing range and an infiltration course. Tank gunnery tables 1 through 7B were fired at the Ho Nai tank range (IT 140120), about 20 kilometers from the school. Though not extensively developed by US training center standards, the Ho Nai range had a moving target facility, a 2000 meter range for firing the table 7B course, and would accommodate 17 tanks. Non-firing (except for blanks) tactical training, driver training, and motor marches were conducted in a public area of about 10 by 12 kilometers just north of and adjacent to the school. This area included streams suitable for M113 amphibious operations. The Armor School had four M24 tank turret trainers, which could be used in the school area with frangible

*The squadron was at 100 percent authorized strength after it received fillers in April 1965.

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(C) FIGURE 9. Distribution of RF armored car platoons by assigned strength, March and April 1965.

sub-caliber ammunition, and had sufficient vehicles, weapons, and communications equipment for instruction and practical work. The only other training facilities suitable for tank firing were ranges at Phuoc Hai (YS 530535) southeast of Ba Ria in Phuoc Tuy Province; one in Khanh Hoa Province (BP 875050) 19 kilometers west of Ninh Hoa on highway 21, and an area northwest of Ia Nang at AT 920840 in Thua Thien Province.

All squadron advisors were in agreement that the existing employment and deployment of armored car units was desirable, but in no case were the armored cars deployed for convoy escort and route security under squadron control. The primary mission of armored car units in most cases was convoy escort and road security, and the squadrons' armored car troops had in fact been split up into platoons and sections and parcelled out to various commanders whose area responsibilities encompassed convoy escort and road security. Many of these commanders also controlled RF armored cars located throughout RVN. It appeared reasonable to convert all the ARVN armored car troop assets to RF armored car platoons, thereby providing the commander charged with area security the organic means to accomplish his mission. Each armored cavalry squadron had a requirement for a small

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number of armored cars, however, to provide security for logistical convoys supporting the widely separated troops of the squadron. In addition the armored car platoon provided a means of protection for commanders and staff in movement to combat elements of the squadron that were in contact or are operating in areas that were not secure.

Determination of whether the ARVN armored cavalry squadrons were properly organized for counterinsurgency was hampered by the fact that none of the squadrons had been employed as a unit and that control of operations by the squadron headquarters was rare. The squadron staffs were organized as US battalion-size unit staffs and functioned similarly. The ARVN squadron staffs differed from corresponding US staffs in that they included an S5 who handled civil affairs, assisted soldiers' families, and conducted recruiting; a finance officer to handle squadron pay matters, and a surgeon who cared for soldiers' dependents as well as the soldiers. It was common practice for dependents to accompany ARVN officers and soldiers and to live near the squadron, and for personnel and finance matters to follow armor channels to the extent that Armor Command kept personnel records for all armor officers and soldiers, controlled their assignments and school quotas, and paid them. All squadron advisors reported that the squadron staffs were adequate with respect to strength and capabilities. It was observed by the evaluators and several of the squadron advisors, however, that because of the infrequent operation of the squadron staffs, they lacked practice in planning and controlling tactical operations.

Corps and squadron advisors in all four corps recommended that more M113 troops and more armored cavalry squadrons be made available. The most frequently recommended number was one squadron per ARVN division, so that there would be at least one M113 troop per infantry regiment. Five of the six squadrons expressed a requirement for a platoon of armored cars organic to the squadron, to be used for squadron convoy escort. Both of the squadrons having experience with the test M106 self-propelled mortar platoon (4.2 inch) recommended that one of these platoons be organic to each squadron as did a third squadron which had not used the self-propelled mortars. The operation of the self-propelled mortar platoon in support of ARVN armored cavalry squadrons is described in the ACTIV report "M106/M30 Weapon System" (U), dated 31 August 1965.

All six squadrons reported a need for engineers to aid in crossing streams or canals and in breaching obstacles, yet two of the squadrons voicing this requirement had depleted their organic pioneer platoons and reported these platoons as units that could be deleted without adversely affecting the squadron mission. Actually, these platoons were limited by training and equipment to light demolitions and pick and shovel engineering, while the need was for a unit capable of removing roadblocks and quickly improving stream crossing sites. In order to support the M113 troops adequately, an attached or organic engineer element would require M113 transportation so as to have the same mobility and armor protection as the troop. All persons questioned stated that the squadron headquarters

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did not need additional personnel.

In general, the squadron commanders and US advisors thought the troop organization was suitable but they proposed several specific modifications. The 1st, 2d, 4th, and 6th Squadrons recommended the addition of an M113 mounted assault weapon for use against dug-in 57mm and 75mm recoilless rifles. Two squadron representatives believed a flat trajectory 40mm weapon would be needed, whereas the two squadrons in the delta believed a 20mm weapon would be adequate. Three ways of incorporating these assault weapons were proposed. The 1st Squadron suggested mounting a 40mm on an M113 in each mechanized rifle platoon and two on M113's in the support platoon. The 2d Squadron proposed a new troop organization consisting of three standard mechanized rifle platoons, an 81mm mortar platoon of three M113's each with a mortar, and an assault gun platoon having three M113's each mounting a 20mm or 40mm gun. This squadron also suggested the addition of an M113-transported armored vehicle launched bridge (AVLB) in troop headquarters. The 4th and 6th Squadrons also recommended adding an M113-transported AVLB to troop headquarters but did not recommend changing the troop organization as extensively as did the 2d Squadron. The 4th and 6th Squadrons proposed the addition of one M113-mounted 40mm or 20mm gun to each mechanized rifle platoon. The 1st Squadron proposal would have required no additional M113's and the 2d, 4th, and 6th Squadron proposals would have added four M113's to each troop. No flat trajectory 40mm weapon suitable for mounting on M113's existed in the US inventory and the only 20mm gun available was the US Navy MKIV. Two of the Navy 20mm automatic cannons were procured by ARVN and mounted on an M113 in the 1st and 6th Squadrons. This weapon proved ineffective as employed by ARVN because of the gunners' inability to place accurate fire on point targets at long ranges. Both squadron advisors recommended that these 20mm cannons be deleted.

At the time of the evaluation no M113 AVLB had been developed but the success of the US 60-ton capacity AVLB mounted on the M60 tank chassis offered hope that a 30 to 40 foot bridge of about 12 tons capacity might be built for the M113. There appeared to be no other way to meet the requirement for crossing streams in 5 minutes or less as desired by the squadron commanders and advisors. The crossing times for a troop using the capstan anchor kit varied from 15 minutes to several hours, depending on the tide and bank conditions. No accurate information was available on the frequency of occurrence of streams or canals of no greater than 30 foot width but the majority of the squadron commanders and advisors stated that most of the obstacles could be crossed with an AVLB with a 30 to 40 foot length. Since the completion of the evaluation a tank bridge has been designed by ERDL. The bridge will span a 30-foot gap and can be employed by the M113. By the addition of two interior balks the bridge has been adopted for use by the M-41 tank using the tank as the bridge launch vehicle. Production of 24 M113 vehicle launch bridges by ARVN 20th Engineer Base Depot is underway with completion expected by April 1966. (See figure 10.)

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(U) FIGURE 10. Barge bridge designed by UNIL.

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The 5th Squadron commander and advisor recommended that the three tanks in squadron headquarters be exchanged for three APC's to be used by maintenance and security personnel. They contended that the headquarters tanks and platoon leaders' 1/4-ton trucks could be eliminated and that an additional M113 should be provided in each troop for maintenance and security personnel. No changes in personnel or organization were proposed for the RF armored car platoons but all persons interviewed strongly recommended replacement of the worn out, unsupportable M8, Ford Lynx, and GMI5 cars.

The project evaluators and the ARVN commanders and US advisors interviewed in all four corps areas were in agreement that the present allocation of one armored cavalry squadron to each corps area was not sufficient for combat operations. The consensus was expressed by the G3 advisor in IV Corps as follows:

The armored forces available to the Commanding General, IV Corps, are habitually employed under division, regiment, or sector (province) tactical control. The paucity of M113 troops available in the corps zone (34,000 square kilometers) and the large number of operations mounted daily indicate that many opportunities for effective employment are missed, especially during the dry season. Nevertheless, tactical command headquarters do employ M113 troops in both favorable and unfavorable terrain with good results. Additionally, the armored cavalry squadron headquarters is available to major subordinate units and is used occasionally as a task force command group. A total of four armored cavalry squadron headquarters could be effectively employed in the corps zone: one with each division and the fourth with corps. This arrangement would provide each division the operational flexibility of an additional tactical mobile command post and serve as a command headquarters for the division direct support squadron. The armored cavalry squadron at corps would be used in general support missions as required. An armored cavalry brigade headquarters is not recommended. Squadron employment and supervision would be effected through the corps G3. Each squadron would contact the Corps Area Logistics Command (CALC) directly for logistical and maintenance support. A regiment has neither the command nor logistical capability of supporting an armor force. Further, the tactical area of operation usually will not justify an organic armor force. Regimental requirements could be handled by the organic division squadron.

In I Corps the judgement was that at least seven M113 troops were needed to perform the mission adequately. The proposed locations were

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Quan Tri, Hue, Hoi An, Tam Ky, Da Nang, Quang Ngai, and Duc Pho. It was the belief of the advisors that with troops in those areas, the reaction times would be greatly reduced and the division and sector commanders would be able to employ these forces by troop rather than by platoon as was currently being done.

2. Adequacy of Types and Numbers of ARVN Armored Vehicles

Advisors to five of the six armored cavalry squadrons did not consider either the M24 tank or its programmed replacement, the M41A3, adequate for use in the Vietnamese counterinsurgency effort. There was uniformity among the advisors in stating that the M24 tank in use was too wide for the bridges, too heavy for the roads and soil conditions, lacked an amphibious capability, and was unserviceable and unsupportable because of age and lack of repair parts. The only significant improvement in having M41A3's was that they were newer and could be supported. Advisors felt a tank for counterinsurgency should be able to operate freely in the country it was committed to and mount at least two caliber .30 machineguns (one a flexible bow gun) and a flat trajectory main gun capable of countering dug-in recoilless rifles.

The 3d Squadron advisor (II Corps) was the only advisor who recommended a second tank troop for use in his area. The responses from the other squadrons all varied but tended to agree that no more tanks were needed.

The squadrons in the delta considered that there was no general need for tanks in IV Corps area but the G3 advisor of that corps stated, "Currently, a platoon of tanks is planned for employment in the Seven Mountains area (VI 970600). Terrain there will support armor operations; however the area is small and could not justifiably support the deployment of more than a platoon." Two division advisors in IV Corps shared the opinion that a platoon of tanks might be useful in some areas of the delta during the dry season. If one platoon were needed for several months each year, it would appear more profitable to attach one from a tank troop elsewhere, provided there was a way to get the tanks to the area.

The 1st and 5th Squadron questioned the need for any tanks except as a strategic reserve to counter hostile armor that might be introduced into Vietnam. Advisors in I Corps considered one tank troop about right for use in that area. A majority of the advisors questioned agreed that, when employed, the tanks should be cross-reinforced with mechanized or dismounted infantry and controlled by corps through the armored cavalry squadrons.

Of the three armored cars, the M3 was regarded as the best by all persons questioned. Assets that advisors attributed to the M3 armored car were: speed, light armor protection; good firepower with the 37mm canister, coaxial caliber .30 machinegun, and pintle-mounted caliber .50 machinegun

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(though some advisors expressed a preference for a second caliber .30 instead of the caliber .50 machinegun); and relatively quiet operation. It was universally considered by all squadron advisors and commanders interviewed that armored cars were much superior to tracked or other wheeled vehicles for the role of convoy escort and route security. In no case did ARVN commanders or US advisors believe there were sufficient armored car units available in Vietnam. Estimates from three of the squadrons as to the number required were an armored car unit organic to each armored cavalry squadron, that was in turn organic to each division. A fourth squadron commander and his US advisor in III Corps recommended an armored car unit of platoon or troop size for each of the three principal supply routes in that corps area. Another squadron recommended providing each squadron one platoon of cars and each province chief enough cars to patrol the roads in his province. The remaining advisor, of the 5th Squadron (JGS reserve), recommended one platoon of cars for that squadron.

As was pointed out above the ARVN armored cars at the time of the evaluation were not employed by troop under squadron control but in all cases were broken out by platoons and sections to provide convoy escort and route security under the control of local area commanders. One of the evaluators discussed this situation as follows:

It is not desirable to have all armor units in a corps area organic to the armored cavalry squadron. The armored car and mechanized rifle units of the provinces, belong right where they are now. Granted that maintenance poses a problem, but the RF/PF headquarters advisors recognize the problem and are taking steps to alleviate it. The armored cavalry squadron advisor in II Corps feels that provinces should have both the responsibility for route security and the means to accomplish the mission. He also believes that each squadron should have a platoon of armored cars for its own convoy escort duty. Most of the other senior advisors of armored cavalry squadrons have expressed this same opinion. The deputy senior advisor to RF/PF has expressed the desire to have armored cars assigned to provinces for the same purpose and the Commanding General of the RF/PF has officially requested in a letter to High Command, RVNAF, that sufficient armored cars be made available to assign each province a platoon for convoy escort and route security. This would amount to 51 platoons (45 in the provinces and 6 in the special sectors).

In three of the four corps, squadron advisors as well as advisors to the corps headquarters felt that convoy escort and route security should be province responsibilities and that armored car platoons should be provided them as needed. An exception to this was the senior advisor to IV Corps, who did not believe that responsibility either for route security or

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armored cars should be given to province chiefs. The advisory personnel of the remaining corps had no strong feelings in this regard.

3. Findings

a. While armored cavalry squadrons averaged 90 percent of their authorized strength, headquarters troops were maintained at an average of 95 percent and combat troops an average of 84 percent.

b. The average student load at the Armor School was over twice the planned capacity with no increase in faculty, while the school staff was at almost 400 percent of its authorized strength.

c. Although ARVN armored cars were organized in troops, their mission required that they be employed as separate platoons.

d. Three of the ARVN squadron commanders and their US advisors who were familiar with the test M106 self-propelled 4.2-inch mortar platoon recommended that one such platoon be organic to each squadron headquarters troop.

e. The majority of the squadron commanders and US advisors to squadrons believed the armored cavalry troop organizations were suitable.

f. Squadron commanders and US advisors to squadrons in three of the corps areas strongly urged the development of an M113-mounted armored vehicle launched bridge (AVLB).

g. Four of the six squadron commanders and their US advisors believed the mechanized rifle troops needed a flat trajectory weapon firing a high explosive round capable of defeating dug-in 57mm recoilless rifles.

h. There was no engineer terrain study of Vietnam which gave soil trafficability and frequency of occurrence of various width water obstacles.

i. There was no flat trajectory, long range, large caliber weapon suitable for mounting on the M113 at the time of the evaluation.

j. The commander and the advisor of the 5th Squadron (all tank) recommended that the headquarters tanks of the squadron and troop be deleted and M113 armored personnel carriers be substituted to provide armored transportation for maintenance and security personnel.

k. The US advisors to squadrons and to Regional and Popular Force headquarters considered the Regional Force armored car platoon organization adequate.

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l. Commanders and advisors of ARVN armored cavalry squadrons and US advisors at corps headquarters stated that one squadron per corps was insufficient.

m. All US advisors of armored cavalry squadrons, most ARVN squadron commanders, and some US advisors of corps stated that the armored cars and tanks in use in Vietnam were inadequate.

n. Five out of six of the US advisors to squadrons and the squadron commanders stated that armored cars were needed in the squadron headquarters to escort squadron supply convoys to the widely separated troops.

o. Because of insufficient personnel, shortage of armored cars, and poor mechanical conditions of the available cars, Regional Forces were unable fully to perform a convoy escort and route security mission.

F. OBJECTIVE 6 - LOGISTICAL SUPPORT REQUIREMENTS

1. Petroleum, Oils, and Lubricants

By and large the petroleum, oils, and lubricants (POL) requirements of armored cavalry squadrons and troops were based on experience factors in each corps area of operation. Fuel consumption for the M113's was understandably greater in the delta areas where there was more swimming operations and deep mud. Three squadrons did not have any system for determining POL requirements and the other three determined their fuel requirements quarterly based on experience, judgement, and the previous quarter's usage.

The ARVN Class III distribution points were operated on an area basis by the Corps Area Logistical Command (CALC) in each corps area. Normally, squadrons issued POL coupons to each of its units, which could be used at any of the class III distribution points. The 5th Squadron, however, reported that its units drew POL from the squadron.

It did not appear that there was a basic load of POL for the squadrons. Two squadrons reported that they did not maintain a basic load of POL. The 6th Squadron reported maintaining a 10,000-liter (2642-gallon) basic load of gasoline per troop along with whatever oil and lubricants they thought they needed. The 4th Squadron had one 2½-ton truck with ten to twelve 55-gallon drums of gasoline per troop which they considered as a basic load, and the 5th Squadron considered full fuel tanks and one spare 5-gallon can per vehicle as their basic load. An example, not including fuel in vehicle tanks, of a basic load developed from field experience is that of the 2d Squadron, shown in figure 11. It was observed that the most common method of refueling tracked vehicles was from 55-gallon drums fitted with a short length of plastic tubing. The crew man-handled the drum onto the top deck of the vehicle and held it in place while the gasoline drained into the fuel tank.

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<u>Trp</u>	<u>79</u> <u>Octane (Gal)</u>	<u>91A</u> <u>Octane (Gal)</u>	<u>Diesel</u> <u>(Gal)</u>	<u>10W</u>	<u>Oil (Gal)</u> <u>30W</u>	<u>50W</u>	<u>Grease (lb)</u>
M8, 1/2 Trp	1309	---	120	--	22	6	44
M113, 2/2 Trp	92	1188	120	40	66	26	44
M113, 3/2 Trp	92	1188	120	40	66	26	44
M113, 4/2 Trp	115	1188	60	40	66	26	44
Hq Trp	563	240	421	8	53	21	33
Sqn Total	271	3804	781	128	273	105	209

In addition, the 2d Squadron carried the following POL on operations:

950 gal 91A octane gasoline
 53 gal 75 octane gasoline
 53 gal 10W Oil
 53 gal 30W oil and coupons

(U) FIGURE 11. Basic load of POL, 2d Armored Cavalry Squadron.

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Transportation of POL from distribution point to the troop was normally by means of organic 2½-ton trucks, though the 5th Squadron reported using squadron trucks. In some cases the troops refueled their vehicles directly from the distribution point. In the delta, where roads were few and water transport more common, it was not unusual for a squadron to establish POL pre-stocks for operations by transporting POL in military or commercial boats and dumping it at a secure town, hamlet, or camp.

Fuel consumption records were not complete in all squadrons and two squadrons had no records at all. Shown in figure 12 are the average monthly POL consumption figures that were available.

<u>Tank Troop</u>	<u>1st Sqn</u>	<u>2d Sqn</u>	<u>3d Sqn*</u>	<u>6th Sqn</u>
Gasoline (gal)	-	-	2235	-
Diesel (gal)	-	-	232	-
Oil (gal)	-	-	146	-
Grease (lb)	-	-	29	-
<u>Armored Car Troop</u>				
Gasoline (gal)	2393	4466	528	-
Diesel (gal)	200	106	141	-
Oil (gal)	145	94	9	-
Grease (lb)	152	73	29	-
<u>M113 Troop</u>				
Gasoline (gal)	5235	7709	5280	5336
Diesel (gal)	187	203	264	-
Oil (gal)	131	222	29	254
Grease (lb)	114	62	22	-
<u>Headquarters Troop</u>				
Gasoline (gal)	5817	5795	1373	3114
Diesel (gal)	233	1780	370	-
Oil (gal)	194	276	17	85
Grease (lb)	99	154	-	-

*3d Squadron data from January to March 1965. No data available from 4th and 5th Squadrons.

Gasoline figures include both 79 and 91 octane, and oil figures include all weights used (10W, 30W, 50W, 90W, and 140W).

(U) FIGURE 12. Average monthly POL consumption by type of troop, July to December 1964.

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2. Ammunition

Ammunition requirements were determined in two different ways. In three of the squadrons, troops determined their own ammunition requirements, and in effect established their own basic load, by adjusting the squadron-specified basic load according to the troop experience with ammunition expenditures. As brought out in annex E, it was not unusual for M13 troops to exceed their basic load of ammunition. One squadron reported no system for determining ammunition requirements and in the remaining two, the troops used the squadron-prescribed basic load without modification. The basic loads prescribed by the squadrons were practically all the same and are shown in figure 13. Each soldier was issued one WP and two fragmentation grenades.

In all cases but two the troops reported that they drew ammunition from the squadron, even though they were attached to a division. In the 4th and 6th squadrons, ammunition was drawn directly from area ammunition supply points.

Normally, ammunition was transported from the ammunition supply points to the using unit by trucks organic to the squadron headquarters troop, though the 4th Squadron reported that trucks organic to the line units were used for ammunition resupply in that squadron. In areas where there were few roads, ammunition resupply was sometimes made by aircraft.

Only one squadron, the 2d, had records of ammunition expenditures, as shown in figure 14.

3. Maintenance

Five of the squadrons maintained a small repair parts load following a parts load list that they derived through experience. This was reported to be a minimal list and, since many items were not immediately available, it was difficult to keep the parts load complete. The parts contained in this list were intended to be sufficient for the squadron to perform second echelon organizational maintenance. The 5th Squadron did not have such a list but squadron maintenance pooled all available parts and issued or used them as needed.

The troops carried very few repair parts. There were lists for types of vehicles and equipment (M13, wheeled vehicles, and weapons) published by JGS, but US advisors considered these to be running spares rather than repair parts, e.g., filters, light bulbs, and fuses.

Squadrons kept the prescribed maintenance records, which were quarterly service and semi-annual service records on both wheeled and tracked vehicles. In addition, squadron maintenance kept a preventive maintenance roster for squadron vehicles, a daily dispatch record, and a current work file. Maintenance records kept by subordinate units differed

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	M24	M8	M113	Per Weapon
Cartridge, 7.62mm, HE	39			
Cartridge, 7.62mm, WP	9			
Cartridge, 37mm, HE		60*		
Cartridge, 37mm, canister		20*		
Cartridge, 81mm, mortar, HE			85	
Cartridge, 81mm, mortar, WP			10	
Cartridge, 81mm, mortar, flare			5	
Cartridge, 57mm, recoilless, HE			6	
Cartridge, 57mm, recoilless, canister			21	
Cartridge, 57mm, recoilless, WP			3	
Cartridge, 40mm, grenade				36
Cartridge, caliber .42, pistol				21
Cartridge, caliber .45, submachinegun				225
Cartridge, caliber .30, M-1 Rifle				120
Cartridge, caliber .30, BAR				1000
Cartridge, cal .30, carbine				90
Cartridge, caliber .30, linked, w/tracer	8000	4000	4000**	4000
Cartridge, caliber .50, linked, w/tracer	1200	1800	1800	1800

* 45th Squadron limited 75 rds HE and 5 rds canister.
 ** 45th Squadron limited 8000 rds per M113.

(U) FIGURE 13. Typical basic load of ammunition per vehicle or weapon.

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Cartridge, caliber .30, carbine	26,300
Cartridge, caliber .30, ball	33,640
Cartridge, caliber .30, linked, w/tracer	233,450
Cartridge, caliber .45, ball	2,800
Cartridge, caliber .50, ball, linked, w/tracer	75,780
Cartridge, caliber .37mm, HE	89
Cartridge, caliber .37mm canister	20
Cartridge, caliber 40mm grenade	580
Cartridge, caliber 57mm recoilless, canister	30
Cartridge, caliber 57mm recoilless, HE	181
Cartridge, caliber 57mm recoilless, WP	21
Cartridge, caliber .30, grenade launching	65
Grenade, fragmentation, M26	1,476
Grenade, incendiary M14	9
Grenade, smoke, HC, M8	8
Grenade, WF, M15	7
Grenade, green smoke M18	10
Grenade, yellow smoke M18	10
Grenade, red smoke M18	10
Grenade, violet smoke M18	8
Block, demolition, comp C, M5 series	40 ea
Cap, blasting, non-electric, special	39
Cord, detonating, reinforced, plicofilm wrapped	200 ft
Fuse, blasting, time	10
Igniter, blasting fuse, weatherproof, M2	47

(C) FIGURE 14. Ammunition expenditure of 2d Armored Cavalry Squadron, January to June 1965.

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among the squadrons. In three of the squadrons it was reported that no records were kept. The 2d Squadron kept before and after operation maintenance (operators' maintenance) forms and daily, weekly, and 1500-mile service records on file for both the M113's and wheeled vehicles. The 5th Squadron units kept only weekly, monthly, and quarterly records and the 6th Squadron kept only quarterly and daily maintenance records.

All the squadrons were provided backup maintenance (third echelon and higher) by the ordnance direct support companies in their respective corps areas. Normally, there was a direct support platoon from these companies attached to each squadron and ordnance contact teams frequently remained with the cavalry troops. The ARVN ordnance direct support companies supporting armored cavalry units were located as follows: 832d in Saigon, 841st in Can Tho, 821st in Pleiku, 810th in Da Nang, and 834th in My Tho. The 832d in Saigon supported both the 1st and 6th Squadrons.

There were two procedures for obtaining repair parts. Major items or components that were repairable were obtained by direct exchange, usually through the ordnance contact team from the direct support company. Items that were expendable, or were unrepairable, had to be requisitioned by stock number, item, and quantity. When an item normally obtained by direct exchange was not available, it was also requisitioned. Requisitions were submitted to the squadron S4, who consolidated them before forwarding to the ordnance direct support company for action.

There was a shortage of mechanics at the unit level. This shortage placed the additional burden of second echelon maintenance on the direct support company which was manned only to perform third echelon maintenance work. The mechanic shortage was most acute in the 3d Squadron, with only 28 of 73 authorized mechanics on hand. A check of three other squadrons disclosed that the 2d and 4th Squadrons were short 50 percent of their mechanics, and the 6th Squadron was short 18 percent.

Only one squadron, the 6th, reported that there were no parts in short supply at the time of the evaluation, though that squadron had in the past experienced delays of several months in getting M113 track and suspension components, tires, and batteries. All other squadrons reported a variety of items that were difficult to obtain. The most difficult items to obtain frequently were the M113 track and suspension components (pins, pin nuts, torsion bars, idlers, and shock absorbers), fuel pumps, spark plugs, and batteries. Though the percentages of deadlines due to lack of spare parts was high, the deadline rate for vehicles other than M24 tanks and M8 armored cars was low.

One of the things that most impressed US observers was that the ARVN armor units took excellent care of their vehicles both in garrison and in the field. Though the M113 was constantly being used, its availability rate was high in all squadrons. In most units the crew, organizational, and support maintenance were outstanding. The M113 was highly

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regarded for its dependability, ruggedness, and ease of maintenance. For example, in the 3d Squadron during the month of March 1965, only four of the 48 M113's were deadlined, all for lack of spare parts. It was reported that M113's turned in by the 6th Squadron for rebuild had averaged about 13,000 miles, during which time they had worn out two or three engines. While this seems like low engine life, the nature of the operations in the delta was hard on engines. The useful life of the rest of the vehicle was almost triple the required design life of 5000 miles before rebuild. Great delay was experienced in getting M1 and M24 parts. For example, there were no new engines for M24's, and it took a total of 9 months for rebuild in Japan.

Of the vehicles deadlined, the percentage deadlined for lack of repair parts varied from none in the 6th Squadron to 85 percent in the 5th Squadron at the time each squadron was visited. The 1st Squadron reported 20 percent, the 2d Squadron 4 percent, the 3d Squadron did not know theirs and the 4th Squadron had a rate of 75 to 85 percent (mainly M24's and M1's).

4. Logistical Support for Regional Force Armored Car Platoons

The Regional Force armored car platoons were MAP-supported except for the Lynx armored car. In the case of the Lynx, its crew was furnished individual equipment and weapons through MAP, but armored car repair parts had to be purchased with GVN funds. Logistical support, except POL, for these platoons was provided by the administrative and direct support logistical company in each province. The organization of this company is included in annex C. The only support provided RF by ARVN was POL, obtaining which was cited by senior advisors to RF as one of the two principal logistical problems of RF. The other problem area was the critical shortage in repair parts for the armored cars. There were numerous instances in which armored car units were not able to participate in operations because of a fuel shortage and in most units an armored car deadline of from 50 to 75 percent existed for lack of parts.

5. Findings

a. Armored cavalry troops determined their own POL requirements, based largely on experience in a given area of operation. There was no prescribed basic load of POL for armored cavalry troops.

b. Armored cavalry troops drew POL from area distribution points operated by the CALC. Squadron provided troops with POL coupons which the troops used to draw POL from any CALC distribution point.

c. Organic troop transportation was used to haul POL from distribution points to the using unit.

d. Squadrons prescribed ammunition basic loads but, in practice, this was frequently exceeded.

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e. Squadron transportation hauled ammunition from corps ammunition supply points to subordinate units.

f. Though JGS had published repair parts load lists for various types of vehicles (except the M24 tank), they did not exist at the squadron and troop level.

g. Maintenance records kept at squadrons were fairly standard throughout all squadrons but records kept at troop level varied as to type and extent of detail recorded.

h. The ordnance direct support company located in each corps area provided backup maintenance for armored cavalry squadrons.

i. The troops requisitioned expendable vehicular repair parts from squadron but components of a repairable nature were obtained by direct exchange with ordnance contact teams.

j. Non-availability of spare parts was responsible for over 75 percent of the deadlines in two squadrons and for significant percentages in two others.

k. In most ARVN armor units crew, organizational, and support maintenance were outstanding.

l. Lack of sufficient fuel and repair parts for armored cars were reported as the two most serious logistic problems for Regional Force armored car units.

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IV. (C) CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

It is concluded that:

1. In order to provide the additional armor support necessary for ARVN operations, sufficient additional armored cavalry squadrons should be organized to provide each division with one organic squadron.
2. All armored cavalry squadrons should have a headquarters troop, at least two mechanized rifle troops, and one tank troop in those squadrons operating in an area permitting the effective use of tanks.
3. There is no requirement for a troop-size armored car unit in the armored cavalry squadron but the squadrons require a platoon-size armored car unit for escort of its own convoys. Each province requires armored car platoons for area convoy escort and road security missions.
4. There were sufficient tank troops but they were not effectively deployed or employed.
5. The M113 armored personnel carrier was well-suited for use in counterinsurgency operations in Vietnam.
6. The MB, GM15, and Ford Lynx armored cars were not suitable for use in Vietnamese counterinsurgency operations because of lack of repair parts, lack of a swim capability, poor cross-country mobility, and inability to carry personnel in addition to the crew.
7. The M24 tank was not suited for use in counterinsurgency operations in Vietnam because of a lack of repair parts and lack of a swim capability.
8. An AVLB was required in M113 units.
9. All armored troop-size organizations were adequate except that the squadron headquarters troop should include one armored car platoon and a self-propelled 4.2-inch mortar platoon.
10. The Regional Force armored car platoon organization was suitable.
11. The armored cavalry squadron headquarters was capable of controlling its own subordinate units plus up to two attached infantry battalions.
12. Armored cavalry squadron headquarters were seldom employed in a tactical role.

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13. Envelopment and pursuit of fleeing Viet Cong forces were appropriate missions for ML3 units, but for which they were rarely used.

14. Province chiefs should be assigned responsibility for convoy escort and route security and be provided sufficient armored cars to accomplish the mission.

15. Instruction at the RVNAF Infantry School in the use of armor was inadequate in scope and quantity.

16. Instruction at the RVNAF Command and General Staff College contained inaccuracies regarding ARVN armor organization and equipment and misinformation on the use of armor in combined arms operations.

17. The influence of Armor Command over armor units sometimes transcended the tactical chain of command and on some occasions weakened and interfered with the command of these units by tactical commanders.

18. The frequent ineffective employment of armor units was a result of commanders of all branches and grades violating the principle of unity of command and not being familiar with combined arms operations.

19. Unless they had a significant terrain advantage the Viet Cong did not seek engagement with armored units.

20. The Viet Cong anti-armor weapons and tactics were not effective in significantly limiting the freedom of action of ARVN armored units except those operating without adequate dismounted security under conditions of reduced visibility and mobility, such as jungles and rubber plantations.

21. In most parts of the delta and other relatively open areas in Vietnam, the Viet Cong anti-armor weapons and techniques were not capable of preventing the effective use of armor in combined arms operations.

B. RECOMMENDATIONS

It is recommended that:

1. Each ARVN division have an organic armored cavalry squadron.

2. Each ARVN armored cavalry squadron be organized with standard-type units to include one headquarters troop and at least two mechanized rifle troops.

3. One tank troop be included in ARVN armored cavalry squadrons operating in areas where tanks can be effectively employed: one squadron in I Corps, two squadrons in II Corps, and two squadrons in III Corps.

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4. Province chiefs be made responsible for convoy escort and route security and be provided with armored car platoons according to the requirement of road nets and the criticality of their area.

5. Suitable replacements be found or developed for the M24 tanks and M3, GM15, and Ford Lynx armored cars. (Since the data collection period, M41A3 tanks have been obtained as replacements for the M24 tanks and the Commando armored car has been programmed to replace M3, Lynx, and GM15 armored cars.)

6. The curriculum of the RVNAF Command and General Staff College and the Infantry School be revised to include adequate material on ARVN armor organization and equipment and to present doctrine and tactical training in combined arms operations.

7. Armor Command be divested of any command influence over tactical armor units or personnel in those units and that it address itself to the responsibility for the development of armor doctrine and tactics, development of improved materiel, and armor branch training. (A mission statement incorporating these recommendations was published October 1965.)

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(C) ANNEX A

SETTING OF THE EVALUATION

1. (U) ENVIRONMENT

The Republic of Vietnam (RVN) occupies a crescent-shaped area of about 67,000 square miles on the southeastern edge of the Indochina Peninsula. Although only 45 miles wide at the 17th parallel, its demilitarized northern border with the Democratic Republic of Vietnam (North Vietnam), it has a seacoast of 1,500 miles on the South China Sea and Gulf of Siam, and western borders with Laos and Cambodia of about 900 miles. The land borders are poorly defined and drawn through difficult and inaccessible terrain.

a. Terrain

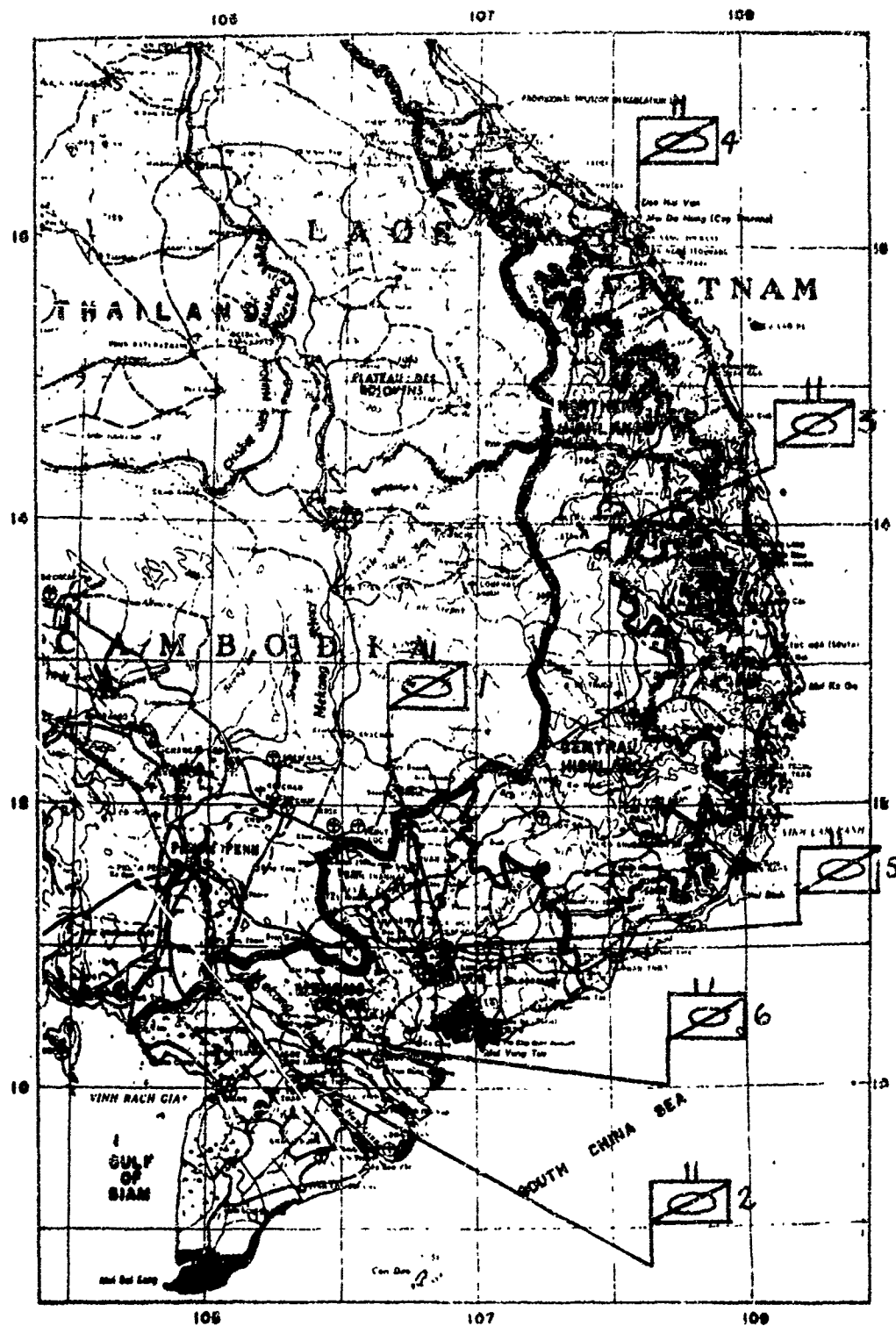
There are four distinct geographical regions: The highlands located in the north and central portion, the plateaus of the central highlands, the coastal plain, and the Mekong Delta in the south. See figure A-1.

The northern two-thirds of the RVN is dominated by a chain of broken mountains and rugged hills extending in a northwest-southeast direction and terminating on the northern edge of the delta plain about 50 miles north of Saigon, the capital. The area is characterized by steep slopes, sharp crests, narrow valleys, and dense vegetation. It is sparsely populated, mainly by primitive and nomadic tribes, and it contains few roads or trails.

The central highlands adjacent to the Laos-Cambodia border contain extensive plateau areas. Here, the mountains give way to more gently rolling terrain. The northern plateau is covered by almost impenetrable tropical forests and jungles, which often have two dense overhead layers of foliage at heights of about 40 and 125 feet. The southern portion is typical savannah country, with large open expanses covered by tropical grasses and open forests. This region is more heavily populated than the northern highlands and has more roads and trails.

The coastal plain, varying from 10 to 25 miles in width, extends from the 17th parallel to the Mekong Delta. At several places mountain spurs jut out to the sea, cutting the plain into a series of compartments roughly at Mui Dinh, Mui Ke Ga, Quang Ngai, Da Nang, and Hue, north of which the spurs become more frequent. The area is characterized by sandy beaches and dunes, backed up by rice fields, fertile areas, and marshes extending to the mountains. It contains many small cities.

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(U) FIGURE A-1. Geographical regions, I.M.

ANNEX A

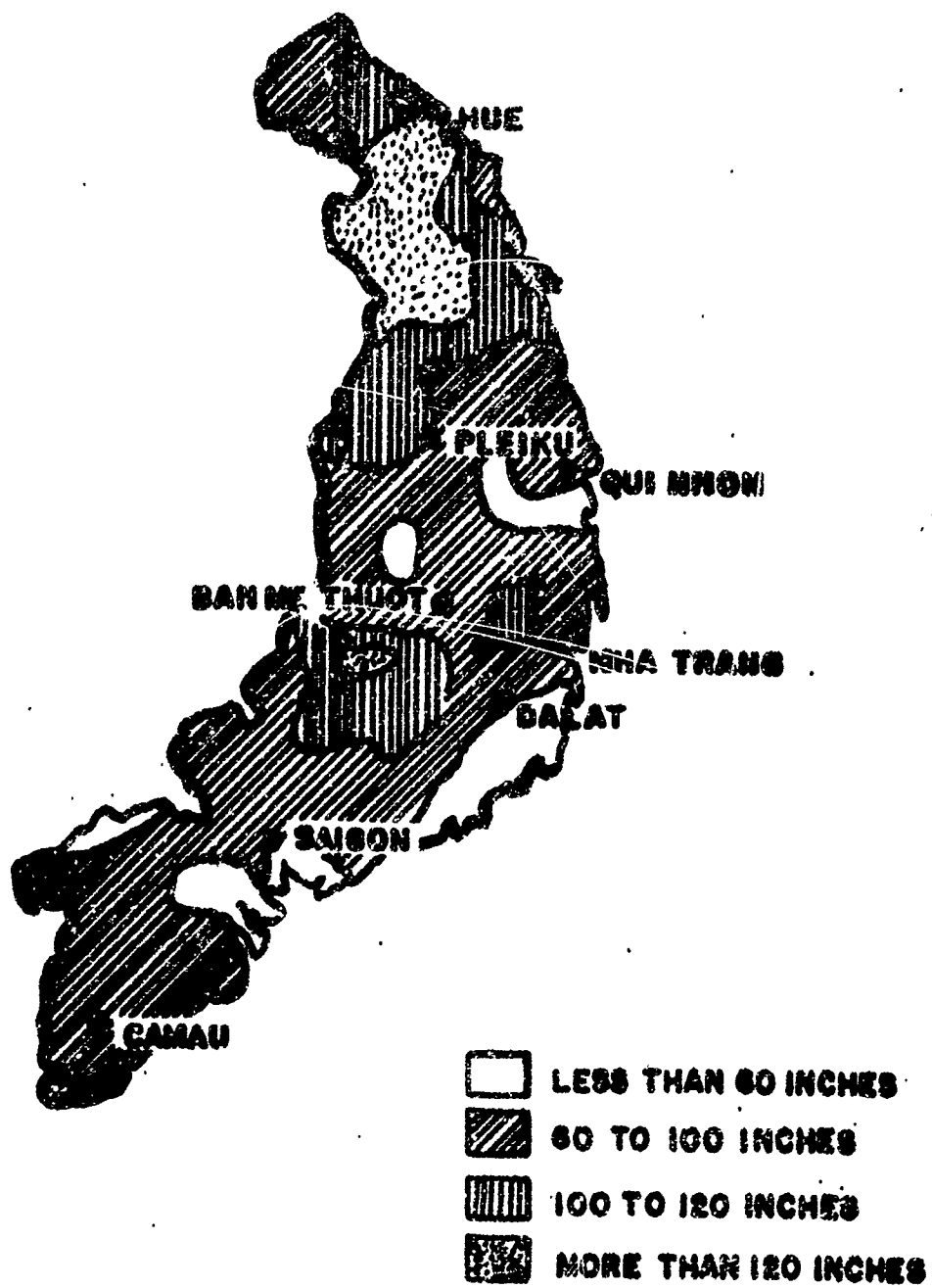
A-2

The southern third of the country is part of the large delta plain formed by the rivers Hau Giang, Mekong, Vam Co, Saigon, and Dong Nai. The Hau Giang flows directly to the South China Sea. The huge Mekong splits into four branches, and the Vam Co and Dong Nai enter the Saigon before reaching the sea. In addition to these major tributaries, the area is cut by a number of smaller streams and a dense network of canals. The plain is relatively flat with few points exceeding an elevation of 20 feet above sea level. It is a very fertile area with more than 9,000 square miles under rice cultivation. Drainage is effected chiefly by tidal action, with the difference between ebb and flood as much as ten feet in some areas. The southernmost tip of the delta, known as the Ca Mau Peninsula, is covered with dense jungles, and mangrove swamps stand at the shoreline and on river estuaries. The eastern portion of the delta plain is heavily forested. The Plain of Reeds, a large marshy area covered with tall reeds and scrub trees, is located in the center of the delta region adjacent to the Cambodian border. During the rainy season, a major portion of the entire area is inundated.

b. Climate and Weather

The climate is hot and humid, subtropical in the north and tropical in the south where the monthly mean temperature is about 80 degrees Fahrenheit. The annual rainfall is heavy in most regions and torrential in many. It is heaviest at Hue which has an annual average of 128 inches. The low of 28 inches at Mui Dinh, a small cape on the eastern coast some 62 miles south of Nha Trang, results from the presence of hills in the area. At Saigon, rainfall averages 80 inches annually. See figure A-2.

Seasonal alternation of monsoon winds profoundly influences the weather throughout the year, although geographical features alter patterns locally. The winter monsoon blows generally from the northeast from early November to mid-March and often brings floods to the northern portion of the RVN. This is the period of the dry season in the delta, which usually lasts from December through March. The winds begin to shift in March, and with the exception of the coastal plain, high temperature and humidity prevail in all of the RVN from April to mid-June. The summer monsoon blows generally from the southwest from mid-June to late August or early September, bringing to the delta region heavy and frequent rains, high humidity, tropical temperatures, and maximum cloudiness. Mountains cause clouds to pile up and deposit moisture before the clouds reach the coastal plain or the northern highlands, which areas are dry during this period. In September the winds begin to shift again, and the coastal plain receives its maximum amount of rain and cloud cover, including severe tropical storms and typhoons.



(U) FIGURE A-2. Annual precipitation, RVN.

ANNEX A

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c. Communications

Roads throughout the RVN are few in number, poorly cared for, and narrow. Road travel to major areas in the north is often stopped completely when bridges and narrow places are destroyed, either by natural causes or the Viet Cong (VC). In the delta region, 2,500 miles of navigable inland waterways ease somewhat the communication burden placed on the 1,200 miles of primary and secondary roads in the region.

A single-track, narrow gauge railroad connects Saigon with the northern provinces by way of the coastal plain. The system and equipment is old and frequently damaged by the VC.

There is no wire telephone communication among the major centers of population. What radio telephone service is available is at the mercy of the often unstable atmospheric conditions over the RVN. Telephone equipment used in major cities is antiquated or makeshift.

In effect, rural areas are virtually isolated. It is not unusual for a VC act of terrorism or sabotage to take place in an outlying delta area and be reported in Saigon a week or more later. Most incidents accounted for take at least two or three days to get into the situation reports to Saigon.

d. Population

The RVN has a population of approximately 15.7 million, with an average density of 234 per square mile. The highland region is generally the least settled of the geographic areas of the RVN, and the coastal plain contains the most people. About 90 percent of the people live on the 13 percent of the land best suited for rice cultivation: the delta and the small river basins of the coastal plain.

Racially, the population is composed of 85 percent ethnic Vietnamese, 6 percent Chinese (who have established a great influence on the economy of the RVN), 5 percent Montagnard (the nomadic aboriginal tribe people living in the highlands), 3 percent Khmer-Cham (of Cambodian descent), and 1 percent European, Indian, and other small groups.

Religiously, about 80 percent profess Buddhism, about 10 percent profess Catholicism, and the rest profess Mohammedanism, Hinduism, Protestantism, Cao Daism, or Hoa Haoism (two local sects).

Socially, there is an upper class composed of old mandarin families, landed gentry, government officials, professional men, intellectuals, clergy, and wealthy businessmen; an urban middle class of civil servants, teachers, and small businessmen; and a lower class, mainly composed of farmers, but with a growing group of urban workers. Mobility upward within the structure is possible but difficult.

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especially up from the lowest.

Vietnamese culture is based on traditional Chinese customs and has been profoundly influenced, especially among the upper class living in the cities, by the French. Most rural Vietnamese continue to follow the traditional way of life. The great divergence in racial, religious, social, and cultural structures has produced continued strife and tension among the people who belong to the various groups. There seems to be no evidence of a permanent stabilizing force available within the Vietnamese society to control conflicting elements.

The Vietnamese have a deep and traditional belief in destiny and man's inability to change the natural order of events. This concept, reinforced by religious beliefs, results in a high valuation of the virtues of stoicism, patience, and endurance. The Vietnamese are proud of their ethnic traditions and hold themselves superior to ethnic minorities in the RVN and to the peoples of neighboring countries.

Most of the people living in the countryside, who make up 90 percent of the population and who provide the main targets for the VC, care neither for the government in Saigon nor for the VC. They want to be left alone to grow their crops, raise their families, have a tranquil old age, and die traditionally.

2. (C) MILITARY ELEMENTS

a. (C) Friendly

The friendly military units employed in this evaluation were the six ARVN armored cavalry squadrons and selected separate armored car platoons of the Regional Forces.

(1) Units

The 1st through 4th Armored Cavalry Squadrons were each organic to one of the four ARVN corps and operated in those corps tactical zones. The remaining two squadrons, the 5th and 6th, were retained under control of the RVNAF Joint General Staff as general reserve. The 5th Squadron, an all-tank unit, was stationed in the Saigon area, and the 6th Squadron, a mechanized infantry unit, was stationed at My Tho and employed by the 7th Infantry Division. Armored cavalry squadron organizations are shown in annex C.

The Regional Force armored cars were organized into 57 separate platoons assigned to provinces and special sectors throughout the Republic of Vietnam.

(2) Other Organizations

Also considered in this evaluation were the following

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organizations whose activities had significant influence on the capabilities and employment of RVNAF armor forces:

- a) RVNAF Command and General Staff College
- b) The Armor Command
- c) The Armor School
- d) The Infantry School

b. (U) Enemy

It is a well-documented fact that the Communist apparatus in the RVN is an extension of the Communist party of North Vietnam, and that direction and materiel and personnel support is received from the North. Supreme authority in the VC political and military organization in the RVN is the Central Office South Vietnam located in Tay Ninh Province near the Cambodian border. Subordinate thereto are four military regions and one special zone (corresponding roughly to the capital area), each of which has a subordinate series of provincial, district, and village-commune party committees.

(1) Units

The VC military forces can be divided into 3 operational categories: main force, local force (together about 35,000 troops), and militia units (60,000 to 80,000 soldiers). The main force consists of full-time units controlled by the military region. Local force units are controlled by province and district committees. They are well-organized, and the personnel are well-trained and well-equipped. Militia units are full- and part-time local armed groups responsible to district, village, and hamlet authorities. Personnel of these units are used frequently as intelligence gatherers, porters, or as reinforcements for main and local force units. They may replace losses in the local force.

A VC battalion is planned for 400 to 500 men, but in reality may consist of as few as 250. A company averages 100 men, and a platoon about 30. Personnel may be acquired voluntarily, by kidnapping, or by impressment using blackmail or threats of violence. There is evidence that large numbers (a total of about 45,000 in four years since 1960) of native-born North Vietnamese have infiltrated from North Vietnam through Laos into the RVN.

Viet Cong forces are in general lightly equipped and have a commensurate degree of cross-country mobility. In addition to individual weapons, they have a large number of automatic weapons, and light crew-served weapons. The larger units are equipped with mortars

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and recoilless rifles. Supplies are obtained through capture, local procurement, taxation, and infiltration. Food staples such as fish, rice, and manioc are readily available.

(2) Capabilities

Because of support rendered by the country people, familiarity with the area, lack of responsibility for life and property, and the nature of guerrilla organization, equipment, and tactics, the VC are able to move virtually at will throughout much of the RVN. They are able to exploit as necessary the differences in race, religion, class, economic condition, and cultural background of their targets. They have a well-developed intelligence system, good discipline, and a usually effective security system.

Viet Cong military operations have the advantages of speed, surprise, deception, and infiltration. Training, accomplished in small, local areas by well-indoctrinated cadre, probably emphasizes selection of the most vulnerable targets, night operations, movement as small units until concentration is required, terrorism and propaganda, use of weapons, employment of terrain and weather, and infiltration. The VC objective is not, at the present stages of their insurgency to hold terrain, but rather to inflict losses on government forces, to capture weapons and materiel, and to convince the people that the government in Saigon cannot protect them and will eventually be defeated.

(3) Limitations

Viet Cong limitations stem from their need for strong security and the largely clandestine nature of their activities. Although the people among whom they live afford them a high degree of protection, active and passive, force must often be used, and support based on threats and fear endures only as long as pressure is brought to bear. Primitive living conditions add to the strain of avoiding government troops until the right moment. The VC are vulnerable to air and artillery attack, and less so to armor attack. Limited logistical capability, lack of communications, and insufficient medicine are other weaknesses.

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(C) ANNEX B

TOE MISSIONS OF ARMOR UNITS

Annex B contains the TOE mission statement of ARVN armor units as follows:

1st through 4th Armored Cavalry Squadrons	B-2
5th Armored Cavalry Squadron	B-2
6th Armored Cavalry Squadron	B-3
Headquarters Troop, Armored Cavalry Squadron	B-3
Tank Troop	B-4
Armored Car Troop	B-4
Mechanized Rifle Troop	B-5
Regional Force Mechanized Platoon	B-6
Armor School	B-6
School Troop, Armor School	B-7
Armor Command	B-7

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1ST THRU 4TH ARMORED CAVALRY SQUADRONS

TOE TG 130

Approved: 15 June 1963

MISSION:

To close with and destroy enemy insurgent forces, using fire, maneuver and shock action. To provide security as directed, by use of organic armored car troops. In event of conventional hostilities, to attack or defend with organic tanks and rifle units, to counter enemy armor, to provide reconnaissance for economy of force, and to provide security for a higher unit.

ASSIGNMENT:

Assigned to corps.

CAPABILITIES:

Conduct counterinsurgency operations requiring a high degree of fire-power, mobility, armor protection, and shock action. Penetrate swamps or inundated areas normally denied to vehicles, make hasty river crossings, using organic units equipped with amphibious carriers. Provide security for routes of communication. In event of conventional hostilities, provide tank-armored infantry teams for attack or defense, screen the parent organization, provide flank and rear security for a higher unit, or serve as a covering force in offensive, defensive, or retrograde operations.

5TH ARMORED CAVALRY SQUADRON

TOE BEING STAFFED

MISSION:

To close with and destroy enemy insurgent forces using fire and maneuver, and shock action. In conventional operations, to attack or defend with organic tanks and counter enemy armor.

ASSIGNMENT:

High Command, RVNAF Reserve.

CAPABILITIES:

Conduct counterinsurgency operations requiring a high degree of fire-power, mobility, armor protection, and shock action. Attack under hostile

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fire. Destroy enemy armor. Support infantry units by fire, maneuver and shock action.

6TH ARMORED CAVALRY SQUADRON TOE BEING STAFFED

MISSION:

To fight with and destroy enemy insurgent forces using fire, maneuver, and shock action. In conventional hostilities to attack or defend with rifle units in coordination with other arms.

ASSIGNMENT:

High Command, RVNAP Reserve.

CAPABILITIES:

Conduct counterinsurgency operations requiring a high degree of firepower, mobility, armor protection, and shock action. Penetrate inundated areas, make hasty river crossings by organic means, serve as a covering force. Flank and rear security.

HQ TROOP ARMORED CAVALRY SQUADRON TOE TG 131 Approved: 15 June 1963

MISSION:

To provide command and control, supply and maintenance for the armored cavalry squadron.

ASSIGNMENT:

Organic to armored cavalry squadron.

CAPABILITIES:

Provides the following to the squadron and attached units: Command, control, staff planning, supervision of operations, communications, supply, administration, and organizational maintenance.

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TANK TROOP
TOE TG 132
Approved: 15 June 1963

MISSION:

To close with and destroy enemy forces, using fire, maneuver and shock action in coordination with other combat units.

ASSIGNMENT:

Organic to armored cavalry squadron.

CAPABILITIES:

Attack or counterattack under hostile fire. Destruction of enemy light tanks. Support of infantry or reconnaissance units by use of direct fire, maneuver, and shock action.

ARMORED CAR TROOP
TOE TG 134
Approved: 15 June 1963

MISSION:

To perform reconnaissance and provide route security for the unit to which assigned. To perform light combat missions. To provide area security.

ASSIGNMENT:

Organic to armored cavalry squadron.

CAPABILITIES:

Ground reconnaissance for higher echelon (close or distant reconnaissance, counter-reconnaissance). Provide security for route of communication and escort for highway convoys. Security of an axis of advance, flank or rear guard for higher echelon usually operating under squadron control. Delaying or harassing action. Rear area security, holding of critical points, reinforcing critical areas.

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MECHANIZED RIFLE TROOP

TOE TG 135

Approved: 15 June 1963

MISSION:

To close with the enemy, capture or destroy him. To make hasty river crossings, raids in force, and harrassing operations to destroy enemy guerrilla bases.

ASSIGNMENT:

Organic to armored cavalry squadron.

CAPABILITIES:

Closing with the enemy and destroying him by fire and maneuver, either mounted or dismounted. Moving rapidly over swamps and inundated terrain previously denied to vehicles. Seizing and holding critical terrain features. Rapidly exploiting success and pursuing the enemy. Combat in cooperation with Air Force elements, airborne, or helicopter borne units. Performing delaying actions. Making hasty river crossings.

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REGIONAL FORCE
MECHANIZED PLATOON
TOE BA/CG-370
Approved: 2 June 1963

MISSION:

To clear roads, maintain security of roads and bridges, patrol, and escort. When reinforced, provide intervention support to stationary posts and conduct small operations.

ASSIGNMENT:

Regional Force Provincial Headquarters

CAPABILITIES:

Provides great automatic weapon firepower and high mobility on roads. Provides light armor protection against small arms fire and artillery shrapnel fragments. Provides security to a road course of 45 km. When dispersed, personnel can fight as infantry. Conducts anti-guerrilla patrols over large areas to prevent road or bridge destruction (Maximum cruising range: 250 kms). Provide automatic weapon fire support to infantry operations. When sufficiently reinforced (by one or two infantry platoons) can rapidly provide intervention support to isolated or advanced posts, or can conduct operations to seize small objectives.

ARMOR SCHOOL
TOE TR-113
Approved: 10 December 1962

MISSION:

To provide armor branch training for selected officers, non-commissioned officers, officer candidates, and certain enlisted specialists of the ARVN.

ASSIGNMENT:

Thu Duc Military School Center

CAPABILITIES:

With assigned school troops and appropriate logistical support from Thu Duc Military School Center this school can conduct resident instruction with a maximum in-training load of 250 students, or 150 students and 2 company size units.

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SCHOOL TROOPS,
THE ARMOR SCHOOL
TOE TR-113

Approved: 18 April 1963

MISSION:

To provide support in personnel and equipment for Armor Branch training conducted by the Armor School.

ASSIGNED:

Armor School, Thu Duc Military School Center

CAPABILITIES:

Provide necessary vehicles and personnel to organize armor units into squad, section, platoon, and company level for instruction. Also provide necessary vehicles and personnel capable of conducting tank gunnery ranges and maintenance instruction.

MISSION AND CAPABILITIES OF ARMOR COMMAND

TG-110 Armor Command (Chief, Armor) TOE Strength of 31 (11 Officers, 10 NCO's and 10 EM)

MISSION:

To advise and assist the General Staff in all matters pertaining to armor -- including organization, training, supervision, and employment; to prepare and submit funding projects relative to armor; to command all armor units, if required; and to command directly all general reserve armored units.

CAPABILITIES:

- a. To study and prepare documents pertaining to armor doctrine.
- b. To prepare armor reorganization and development planning as required.
- c. Collecting, interpreting and analysing information pertaining to armor tactics, organization and materiel of hostile forces.

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- d. Technical training and supervision of all armor units.
- e. To conduct inspections of all armored units to determine combat readiness and proficiency.

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(C) ANNEX C

ORGANIZATIONS

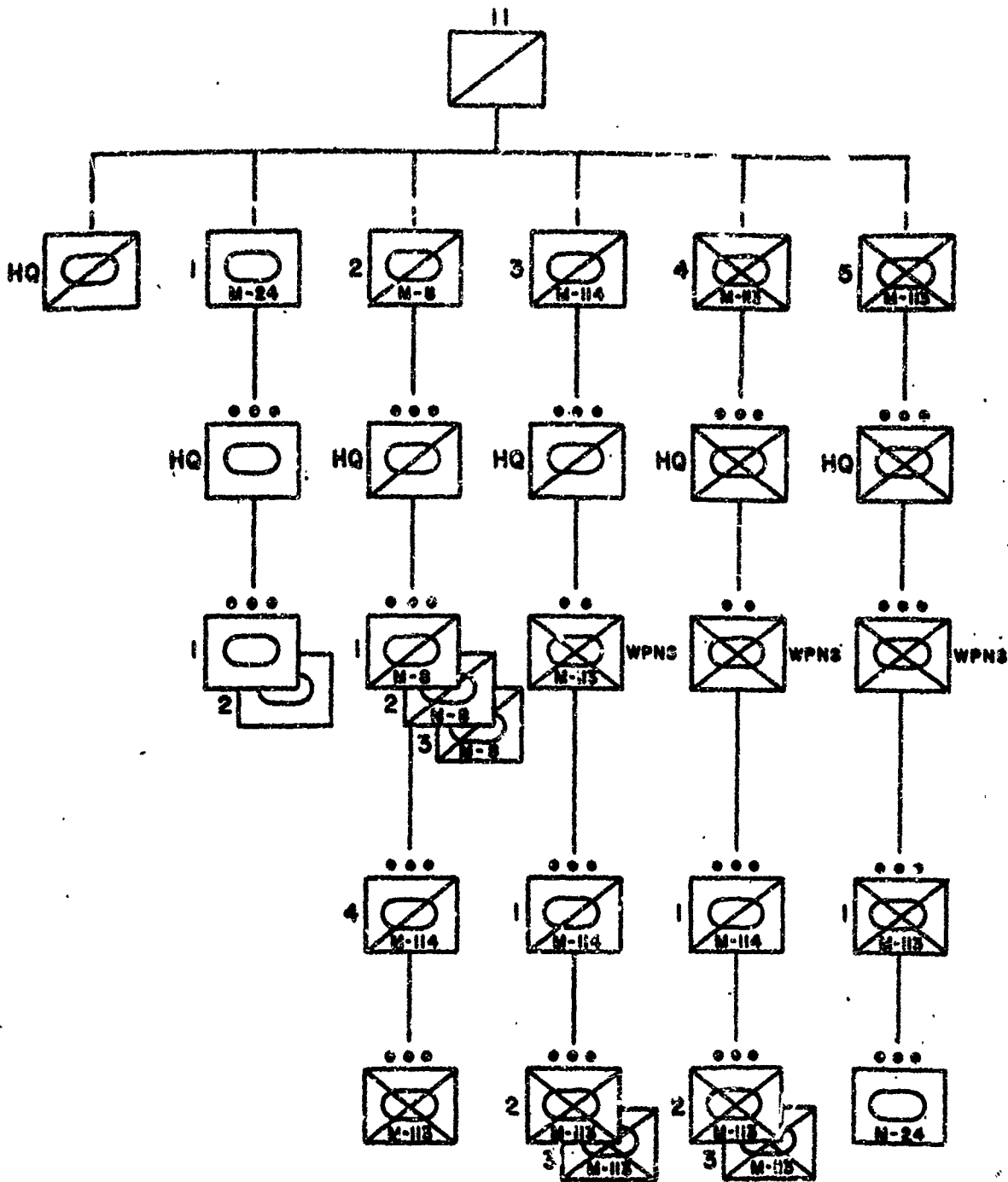
Annex C contains the ARVN armor organizations as follows:

Experimental Organization, Armored Cavalry Squadron (1962)	C-2
1st and 2d Armored Cavalry Squadrons	C-3
3d Armored Cavalry Squadron	C-4
4th Armored Cavalry Squadron	C-5
5th Armored Cavalry Squadron	C-6
6th Armored Cavalry Squadron	C-7
Regional Force Mechanized Platoon	C-8
Armor School	C-9
School Troops, the Armor School	C-10
Regional Force Administration and Direct Support Logistical Company	C-11

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EXPERIMENTAL ORGANIZATION, ARMORED CAVALRY SQUADRON (1962)



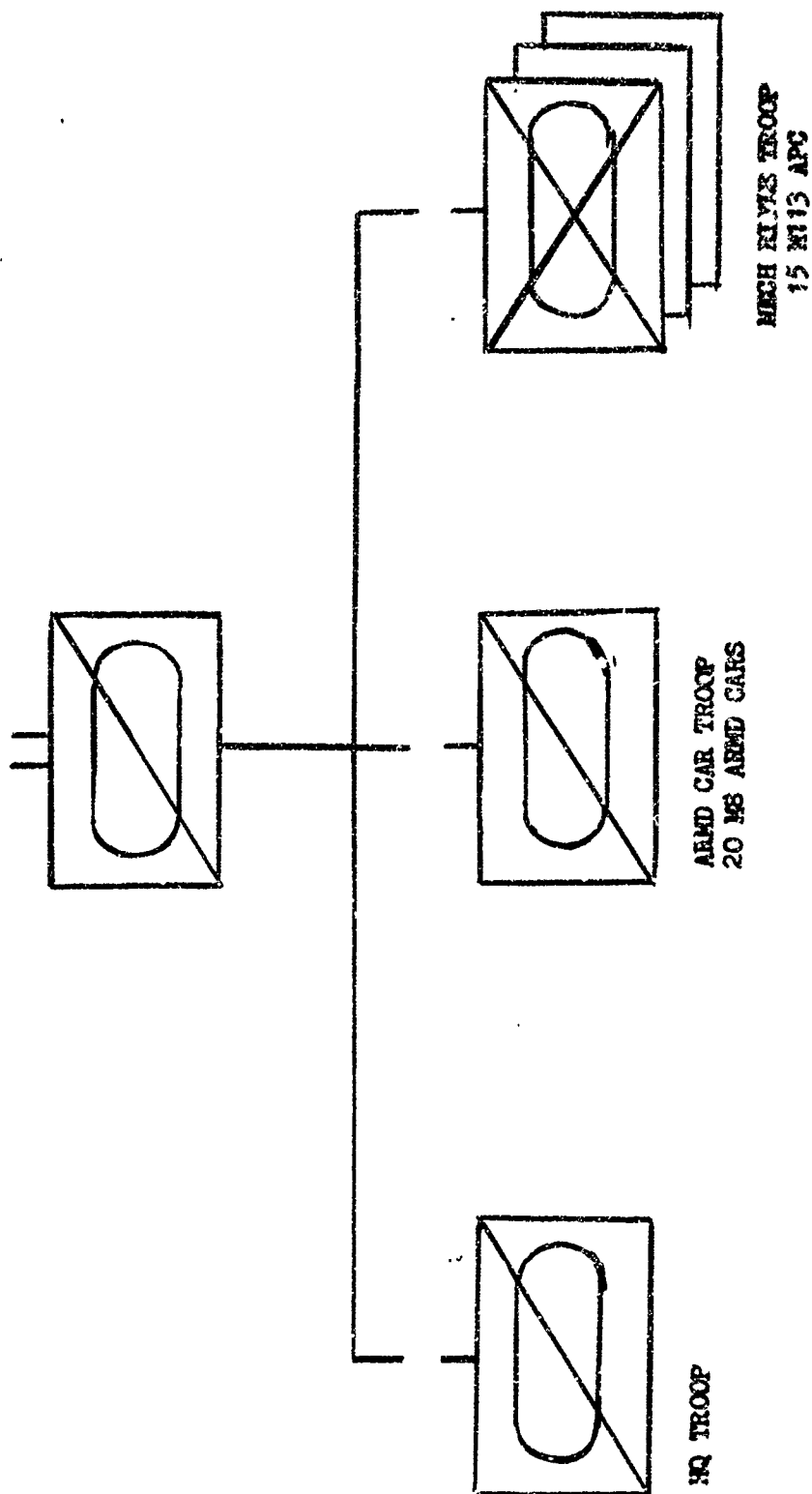
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1ST ARMORED CAVALRY SQUADRON ATTACHED
TO III CORPS
AND
2D ARMORED CAVALRY SQUADRON ATTACHED
TO IV CORPS



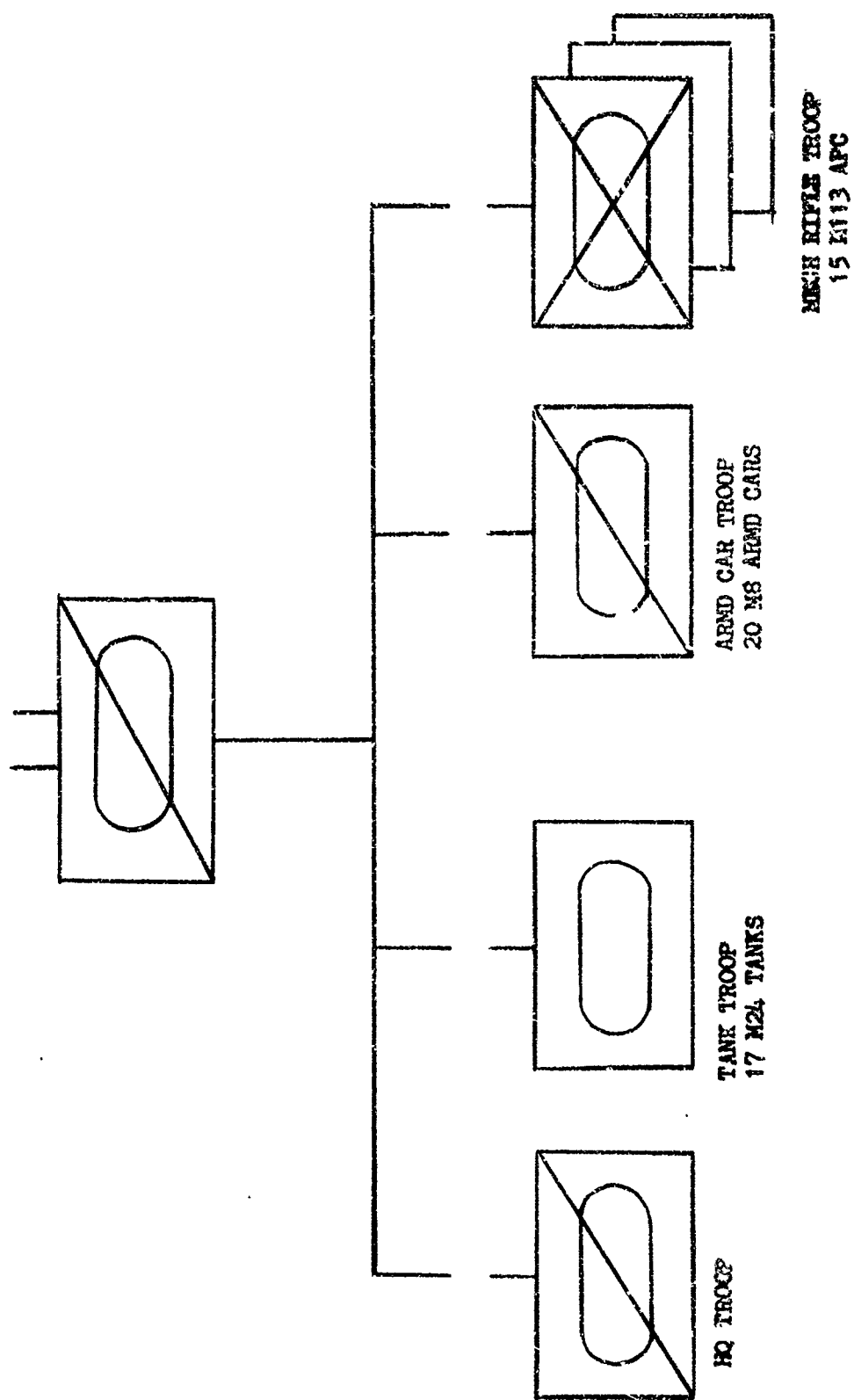
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3D ARMORED CAVALRY SQUADRON ATTACHED
TO II CORPS



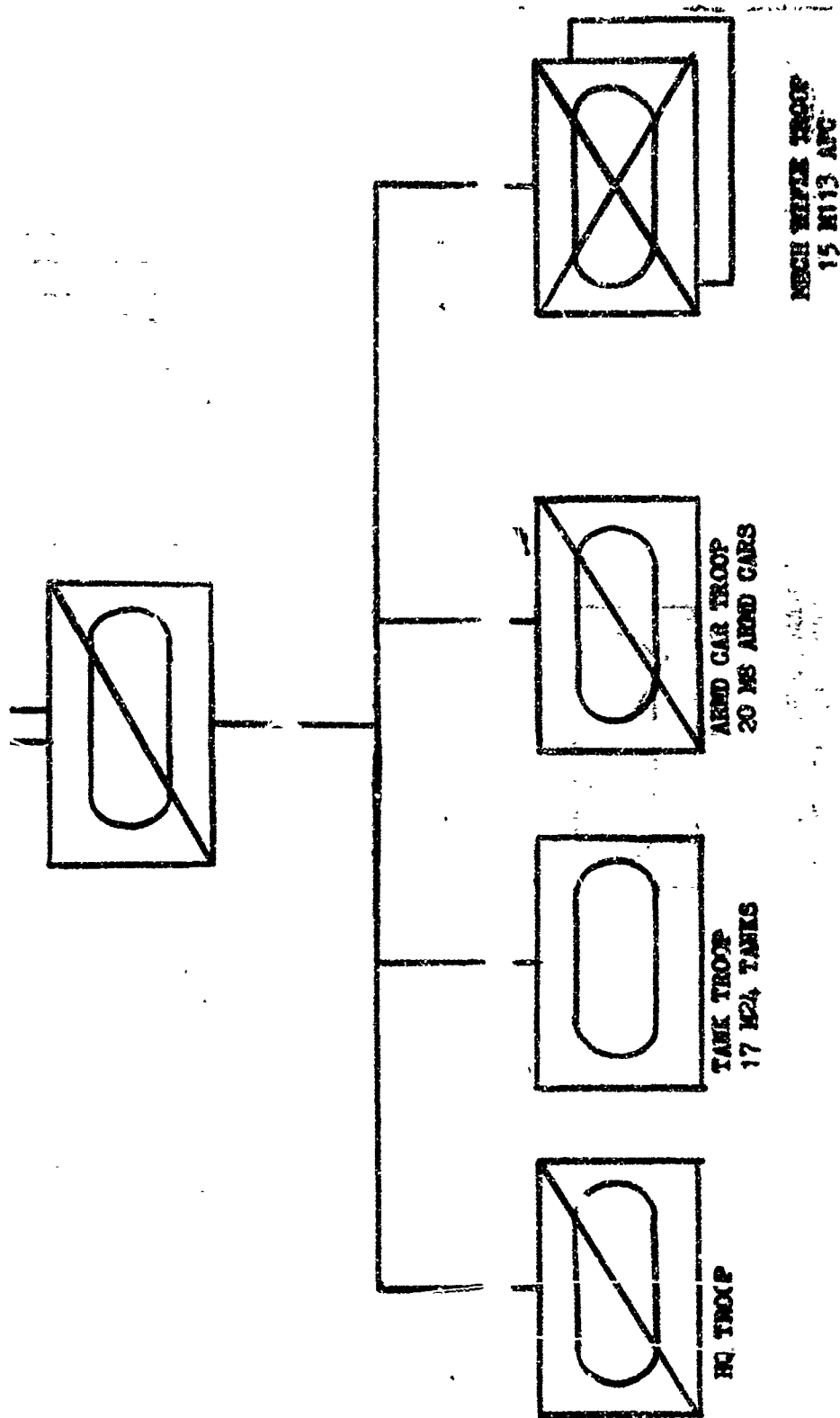
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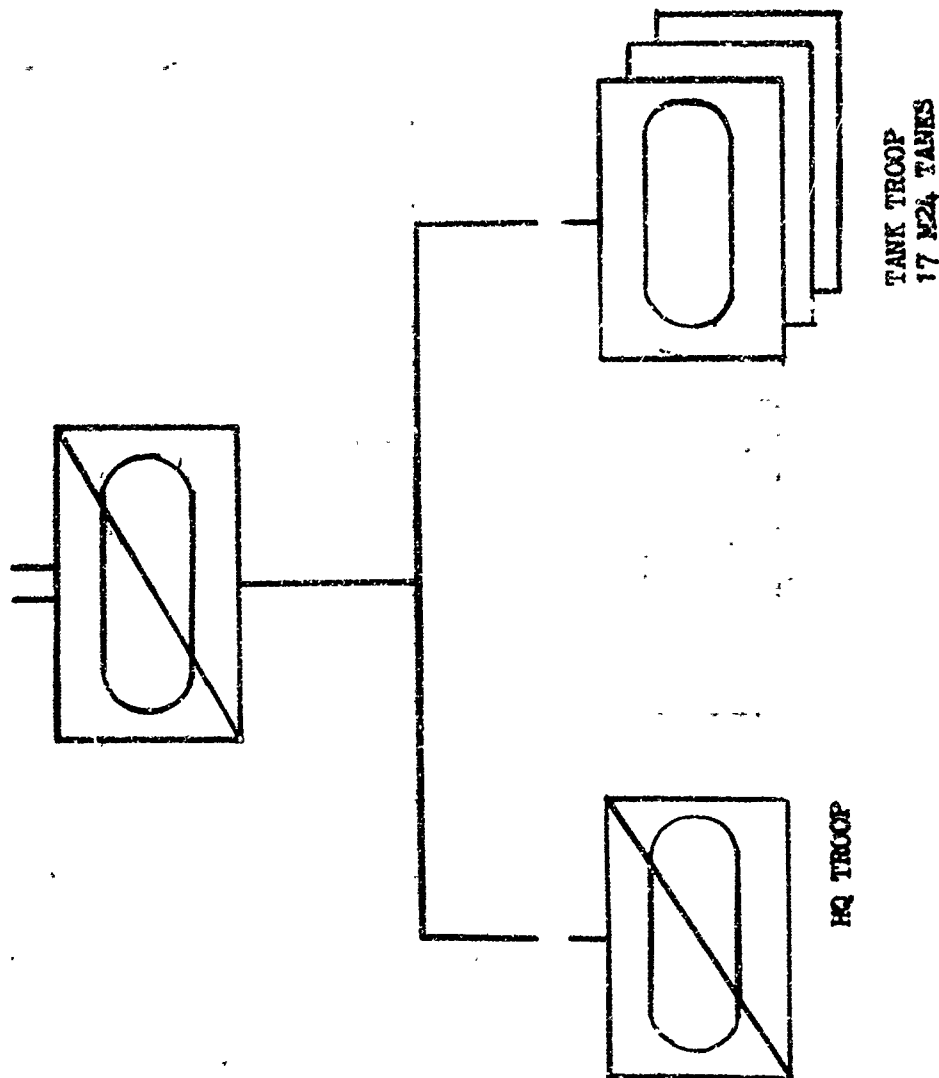
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5TH ARMORED CAVALRY SQUADRON
HIGH COMMAND, RVNAF RESERVE



ANNEX C

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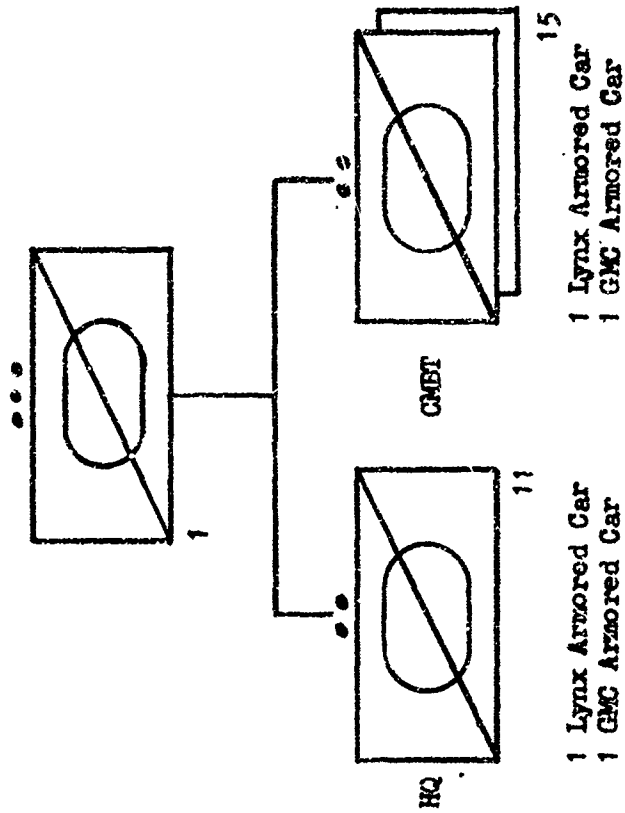
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REGIONAL FORCE MECHANIZED PLATOON

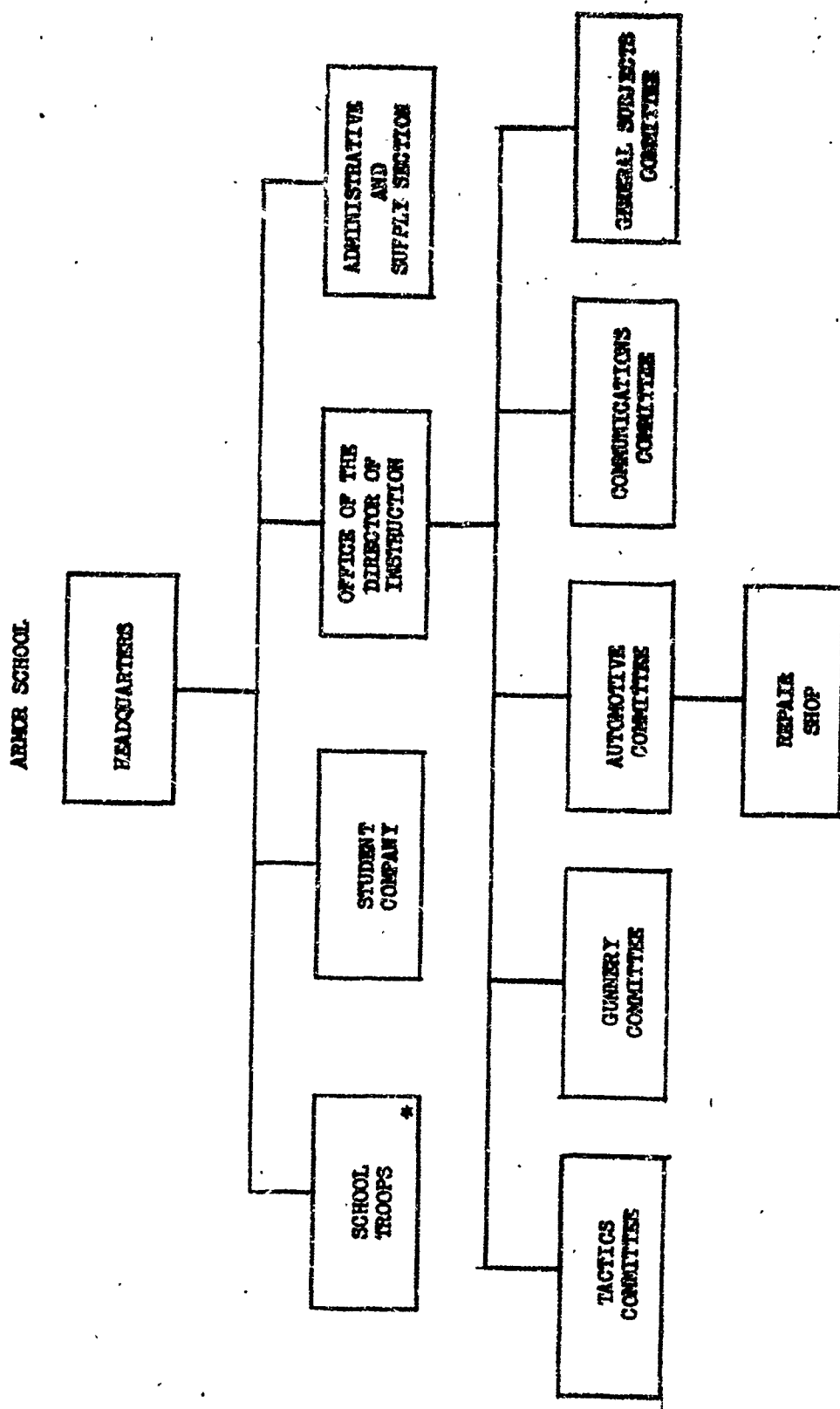


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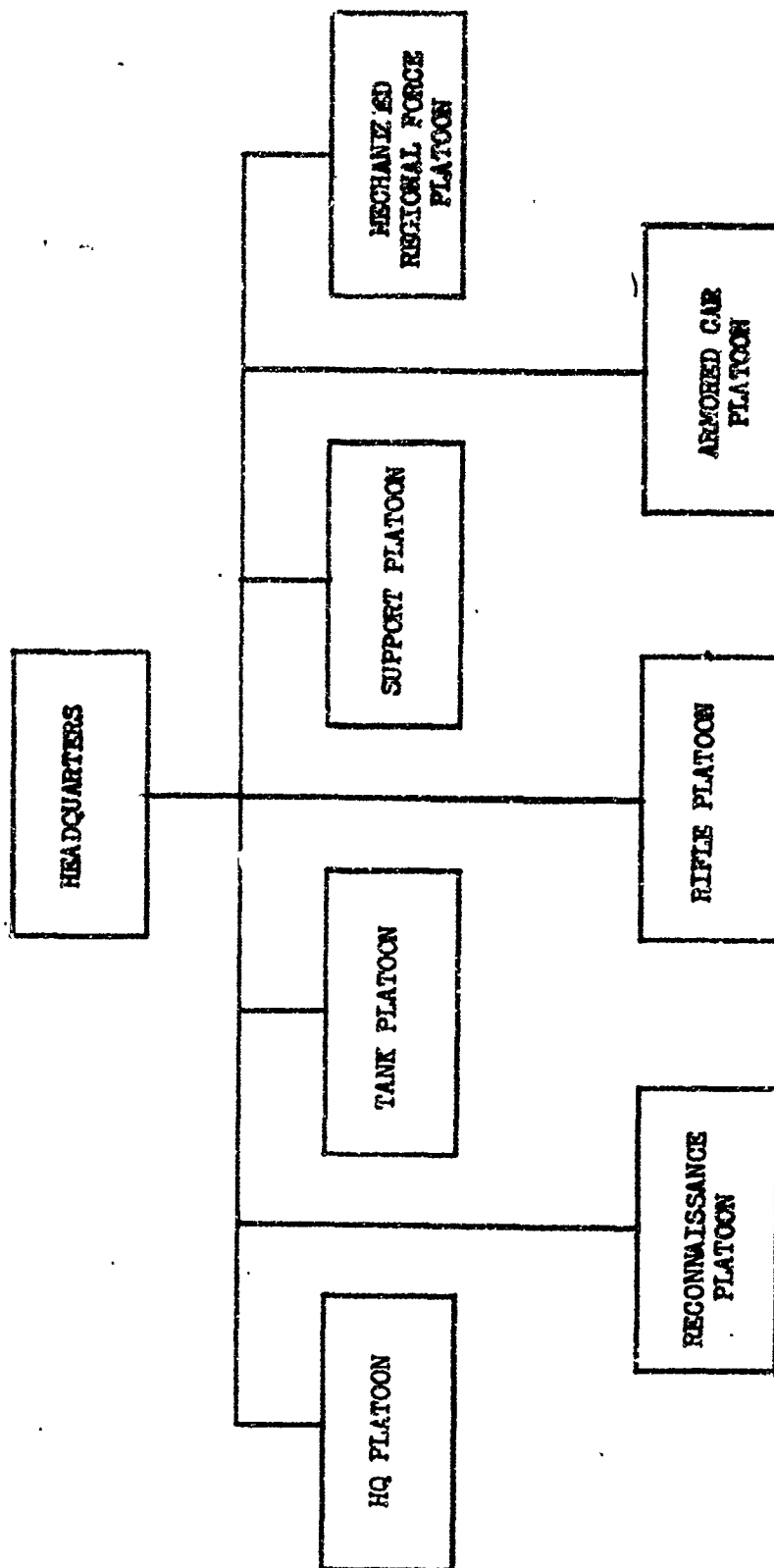


* Has separate TC's; not included in this TOS

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SCHOOL TROOPS
THE ARMOR SCHOOL



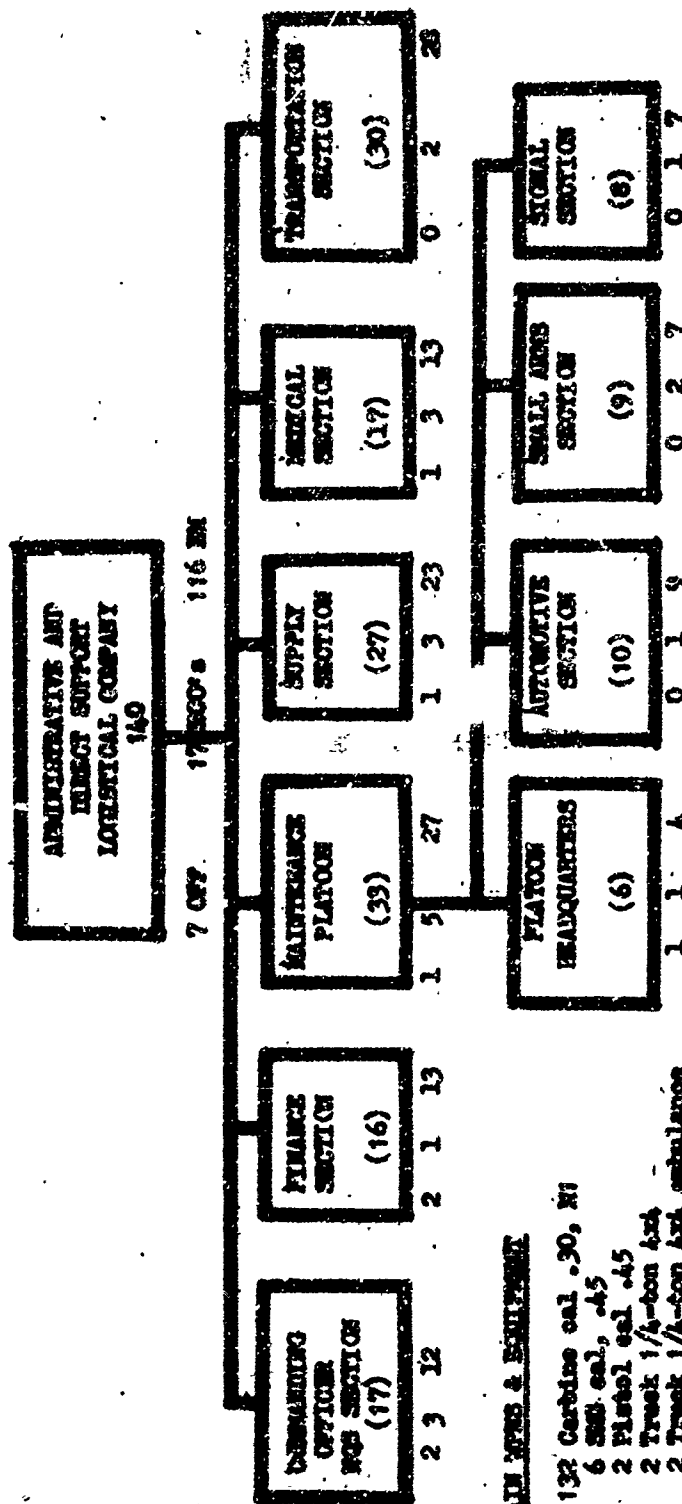
ANNEX C

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REGIONAL POWER
ADMINISTRATIVE AND DIRECT SUPPORT
LOGISTICAL COMPANY
TOMB RA 290



MAIN ARMS & EQUIPMENT

- 132 Carbine cal .30, M1
- 6 SMG cal. .45
- 2 Pistol cal .45
- 2 Truck 1 1/4-ton 4x4
- 2 Truck 1 1/4-ton 4x4 ambulance
- 4 Truck 3 1/4-ton 4x4 W/O W
- 1 Truck 3 1/4-ton 4x4 ambulance
- 2 Truck 2 1/2-ton 6x6 W/W
- 9 Truck 2 1/2-ton 6x6 W/O W
- 2 Trailer 1 1/4-ton
- 5 Trailer 1-ton, cargo
- 2 Trailer water tank, 250-gal capacity
- 1 Radio AM/UMC 87
- 6 Telephone TA 312/PT
- 1 Generator set, 2 kw, 12 v

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ANNEX C

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(C) ANNEX D

M113 OPERATIONS SOP, 2D ARMORED CAVALRY SQUADRON

Annex D contains an SOP for M113 operations prepared by the 2d Armored Cavalry Squadron for use by IV Corps units.

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REPUBLIC OF VIETNAM
REPUBLIC OF VIETNAM ARMED FORCES
IV CORPS
2ND ARMORED CAVALRY SQUADRON
Message: 2450/TD2/P3

M113 OPERATIONS SOP

I. (U) PURPOSE

A. References: JGS Letter 1151, dated 26 September 1963.

B. This SOP is to assist the units of IV Corps in the employment of the M113 and to understand:

1. Capabilities & limitations.
2. Operational missions appropriate for M113 Troops.
3. Logistical & maintenance requirements for M113.

II. (C) DATA AND CAPABILITIES OF M113

A. M113 Personnel Carriers.

1. Weapons

- (a) One (1) cal .50 w/gun shield (open cupola) and one (1) cal .30 ground mounted on either side. (6 per troop).
- (b) One cal .30 cupola mounted and one (1) cal .30 ground mounted.

2. Dimensions and Weight.

- (a) Length: 16 feet
- (b) Width: 8.8 feet
- (c) Height: 7.2 feet
- (d) Ground Clearance: 1.4 feet
- (e) Combat Loaded: 22,900 pounds

3. Remarks. In IV Corps area, KIFFEL type bridges will support crossing of M113.

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(C) ANNEX D

M113 OPERATIONS SOP, 2D ARMORED CAVALRY SQUADRON

Annex D contains an SOP for M113 operations prepared by the 2d Armored Cavalry Squadron for use by IV Corps units.

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(a) KIFFEL class 2 REIT - US (new model supports crossing of M113 with ease. Bridge classification:

- (1) Length: 21 meters
- (2) Width: 3.578 meters
- (3) Tonnage: 12 tons

(b) KIFFEL Class II N (old type) support caution crossing of M113 provided bridge is in good repair (bottom sound and side railings undamaged). If this type of bridge has been previously damaged and repaired or bridge structure is weak, it will not support M113 crossing.

- (1) Length: 21 meters
- (2) Width: 2.75 meters
- (3) Tonnage: 3 tons

B. Combat Capabilities

1. Firepower

(a) Assault element: Eleven (11) carriers with five (5) cal .50 and fifteen (15) cal .30 MG's.

(b) Support element: Four (4) carriers with three (3) 81mm mortars (ground mounted) and two (2) 57mm RR.

2. Troop Combat Strength (See Incl. 1).

(a) Infantry Element.

- (1) Each carrier has 13 personnel assigned.
 - (a) One infantry squad (11 men)
 - (b) One driver
 - (c) One gunner

(2) Normally in the conduct of a operation, the strength of the assault element will vary according to personnel available. Factors which influence number of personnel are:

- (a) Personnel assigned to troop
- (b) Rear detachment personnel

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(c) Combat and administrative losses

(d) Number of carriers in final assault

(3) The dismounted assault is normally conducted with a troop strength of 80 - 100 men.

(4) To operate the MG's on the carrier, which provide a base of fire, two gunners and one loader remain mounted at all times for a total of four men per carrier (to include the driver.)

(b) Support Element.

(1) 81mm mortars whenever possible are ground-mounted to support combat operations. These are manned by the normal crew of six (6) men.

(2) The two (2) 57mm RE can be used either as a direct support weapon or accompany the assault element.

III. (C) MOVEMENT CAPABILITIES

A. Speeds.

1. Highway: 30 MPH
2. Dry rice paddy: 10 - 15 MPH
3. Rice paddy: 6 - 10 MPH

B. Impassible terrain

1. Swamp grass (inundated areas)
2. Mangrove swamps (U-Minh and Tra Tien areas)
3. Palm groves and dense jungle growth

C. Operational capability without resupply

1. Dry season operating over dry ground: Two days or 60 miles.
2. Wet season operating in wet terrain: One & one half days or 45 miles.

D. River and canal crossing.

1. The selection of a good crossing site is dependent upon a thorough reconnaissance, map, air and ground. Time in crossing will be reduced if the site selected has favorable crossing characteristics.

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2. Factors which influence M113 crossing capabilities.

(a) Slope and condition of the banks.

(1) Slope must be less than 60%, both entering and leaving the water. The soil must be relatively firm and the bottom free from excessive mud.

(2) Crossing site must be free from natural and man made obstacles. Villages, trees and/or heavy vegetation restrict crossing and require additional pioneering to overcome.

(b) Crossing over rivers should be accomplished at high tide whenever possible to facilitate the entry and exit from the water.

(c) Water performance of M113.

(1) With the current: 3 1/2 MPH.

(2) Against the current: 2 MPH.

3. Time required to cross canals and rivers: (See Incl 2).

IV. (C) AREAS WITHIN IV CORPS FOR M113 EMPLOYMENT

A. Operational areas, year around.

1. Kien Phong.
2. Vinh Binh (except the mangrove area vic Long Toan).
3. Ba Xuyen.
4. Bac Lieu (except for coastal strip)
5. An Xuyen (except mangrove area along coast and the southern peninsula)

B. Operational areas, dry season.

1. An Giang
2. Chuong Thien
3. Chau Doc

C. Limited operations possible year around

1. Vinh Long

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2. Phong Dinh

D. Area restricted to M113 employment

1. Kien Giang (Tra Tien mangrove)

2. An Xuyen (U-Minh Thuong and U-Minh Ha mangrove)

V. (C) MISSIONS FOR M113 TROOP

A. Appropriate missions for M113 troop.

1. Attack (This is the primary mission)

2. Search and clear within a zone

3. Blocking force

4. Reserve

B. Offensive tactics employed by M113 troops

1. VC defense against M113

(a) Recently VC units have demonstrated proficiency in defense against the M113.

(b) VC defense doctrine includes:

(1) Employment of natural and man made obstacles

(2) Employment of 57mm RR positions

(3) Strong defensive positions to front and flank, little protection within rear of position.

2. General consideration.

(a) To provide the M113 troop with additional troop strength, one infantry company should habitually be attached to the troop.

(1) To augment organic infantry in the dismounted assault.

(2) To seize objectives where the carrier is unable to close on the objective.

(b) In offensive operation it is desirable to use the M113 in conjunction with other forces, i.e. Infantry Battalion.

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3. Attack of a strong defensive position can be accomplished using three techniques.

(a) M113 troop, reinforced, attack the objective from the front, using the carriers to deliver a heavy volume of fire, and an infantry battalion attacking one of the flanks of the position.

(b) Infantry battalion attack the objective from the front, using the M113 troop, reinforced, to attack one of the flanks of the position.

(c) Simultaneous attack with the M113 troop, reinforced, and the infantry battalion from same direction.

C. Missions not appropriate for M113 troop

1. Road clearing
2. Escort missions
3. Road security or defense of a strongpoint. (outpost)
4. River reconnaissance
5. Platoon sized night ambushes.

D. Night Operations

1. M113 have the capability of operating at night to accomplish the same missions as daylight operations.

2. Night operations because of the added difficulties created by restricted vision requires detailed plans to include:

(a) Thorough knowledge of area of operations
(Prior knowledge of the area desirable)

(b) Route of advance must be selected and reconnaissance conducted during daylight hours.

(c) Objective area must be well defined and is generally smaller than daylight objective.

3. Conduct of night operations

(a) Rate of advance in attack will be reduced. Infrared equipment can be used but control of the carriers is difficult.

(b) Close coordination between infantry and M113 to provide additional security for the carriers is required.

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(c) Illumination must be carefully planned to provide artificial light for assault on the objective.

VI. (C) PLANNING THE OPERATION

A. Coordination with the M113 personnel is essential.

1. Troop commander must be consulted in planning operations whenever possible.

2. Squadron liaison officers can assist Headquarters using the M113 in their plans.

B. Developing the operation plan.

1. Area involved must be analyzed.

(a) Prior knowledge of area by personnel from M113 units is helpful in developing a scheme of maneuver that will obtain maximum benefit from M113's.

(b) If area is unknown, air reconnaissance (L19 or UH1B) is necessary. This should be conducted by personnel from the M113 unit to take advantage of their knowledge of the M113 capabilities and terrain.

(c) If the terrain is unfavorable, M113's should not be used as nothing will be gained attempting to maneuver the troop over unsuitable ground.

2. Tentative plan must be developed.

(a) Time factors are important.

(1) Time from LD to the objective must be estimated based on prior knowledge of the area and knowledge of M113 capabilities. (See Incl 2.)

(2) It is desired that the M113's and supporting infantry arrive on the objective at the same time in order to make maximum use of shock action and firepower.

(b) Selection of LD

(1) Well defined, easy to recognize.

(2) If canals are used as this control feature, the far bank should be used as the LD.

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(c) Route of advance

(1) Should be selected over most favorable terrain consistent with the tactical situation.

(2) Avoid to maximum extent possible natural obstacles.

(3) Should be flexible; if progress on assigned route becomes difficult, alternate routes should be available to be used to facilitate advantage without disrupting the scheme of maneuver.

3. Finalized plans will be issued as operation order.

VII. (C) LOGISTICS

A. Class III

1. Consumption rates (based on 80 gals capacity)

- (a) On highways: 140 miles
- (b) Cross country: 65 miles
- (c) Rice paddy - inundated areas: 40 miles
- (d) Idle speed: 10 - 12 gallons per hour

2. Gasoline resupply rates (based on 65 miles of highway travel)

- (a) M113 (15) 350 gals of 91 octane
- (b) 3/4 ton (2) 18 gals of 70 octane
- (c) 1/4 ton (2) 10 gals of 70 octane
- (d) Wrecker (1) 28 gals of 70 octane

3. POL resupply locations, IV Corps

- (a) Main supply points
 - (1) Soc Trang
 - (2) Can Tho
 - (3) Vinh Long
- (b) Auxillary supply points
 - (1) Tra Vinh

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(2) Cao Lanh

(3) Rach Gia

B. Class V

1. Basic load of Class V for M113 troop

<u>Weapon</u>	<u>Basic Load</u>	<u>Weapons Asgnd</u>	<u>Total Rounds</u>
Carbine	90 rounds	67	6,030
M-1	120 rounds	92	11,040
45 SMG	225 rounds	6	1,330
BAR	1000 rounds	18	18,000
Cal 30 MG	4000 rounds	15	60,000
Cal 50 MG	1800 rounds	6	10,800
57mm RR	30 rounds	2	60
81mm Mortar	80 rounds	3	240
M-79	30 rounds	3	90
45 Pistol	21 rounds	18	378

2. Expenditure rates: Against a strongly defended position (occupied by VC company or better) approx. 2/3 of the basic load will be expended during the contact and seizure of the objective.

C. Resupply methods.

1. Normal means of resupply of Class III and V will be organic wheeled vehicles. Supplies will be taken to the control Headquarters CP where the M113's will return to accomplish resupply.

2. Other methods

(a) Helicopter. When the M113's are unable to return to the CP or to roads where wheeled vehicles could effect resupply, helicopters can be used.

(b) Boats. If secure waterways exist, resupply can be accomplished by using boats to bring Class III and V into the operational area.

(c) Aerial drops. This method is least preferred because of the difficulty in obtaining permission to use cargo aircraft and the wide dispersion of supplies once dropped.

VIII. (C) MAINTENANCE

The M113 troops require extensive maintenance in order to keep their equipment operational. Units using the M113's must allow adequate time

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for the troop to perform this necessary requirement.

A. General

1. When maintenance is scheduled, the troop should not be required to conduct combat operations. All personnel are needed to perform adequate maintenance.

2. Maintenance must be accomplished in a secure area where equipment and personnel are not exposed to enemy activity.

B. After-operation maintenance. Time allotted should be roughly one hour of maintenance for each three hours of operation or one day of maintenance for each three days of operation.

C. "Q" service or 750 mile maintenance service. Performed quarterly or 750 miles.

1. Complete overhaul of carrier is performed to include checking the electrical system, engine, suspension system and signal equipment.

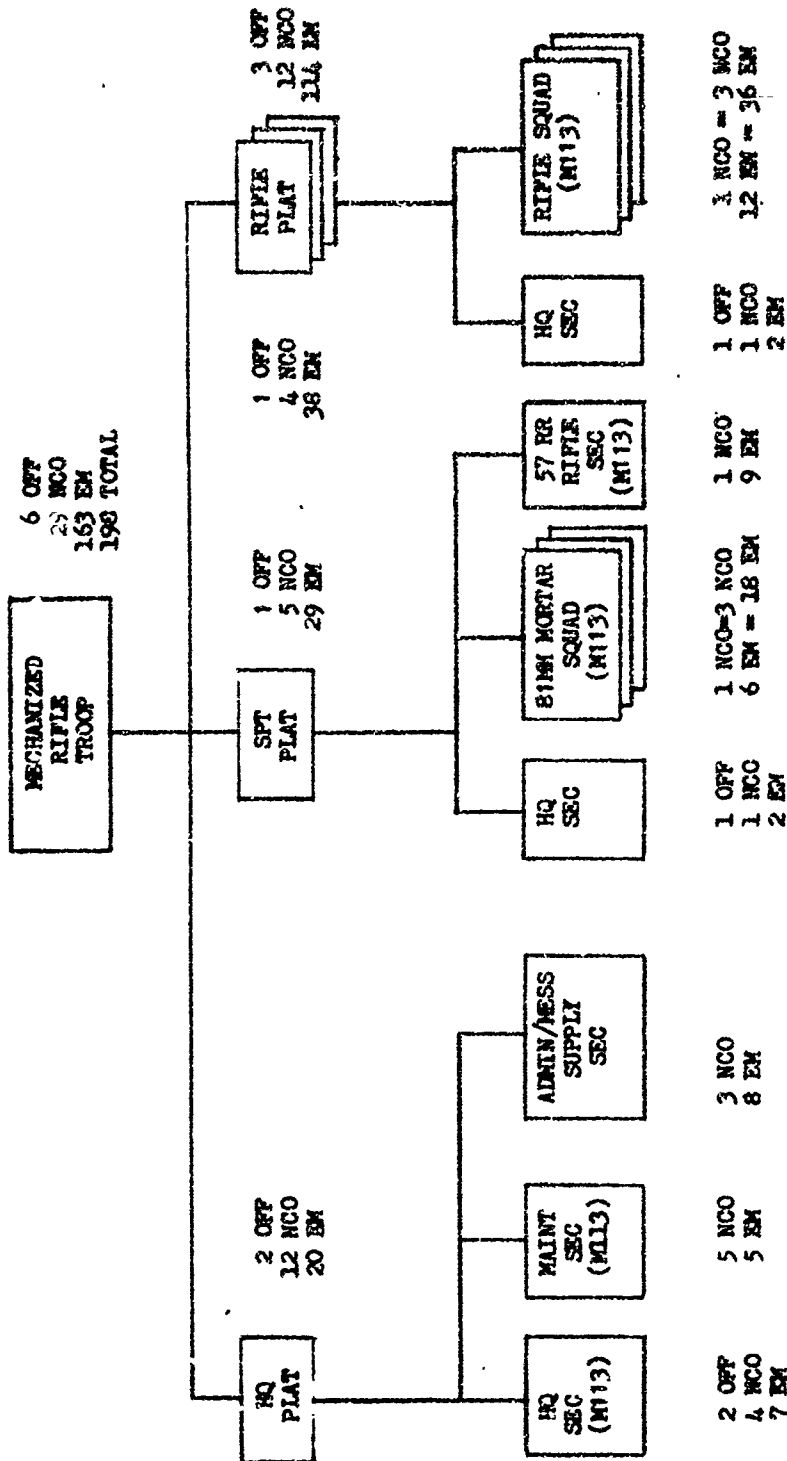
2. This must be performed at the Troop or Squadron base camp in order to use the Ordnance and Squadron maintenance facilities.

3. One week should be allocated as a minimum to perform this service.

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MECHANIZED RIFLE TROOP ORGANIZATION, 2D ARMORED CAVALRY SQUADRON



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ESTIMATED WATER CROSSING TIMES

DESCRIPTION OF OBS

TYPE OF OBSTACLE	WIDTH	FITS CHARS	CURRENT	TIDE	TIME REQUIRED TO CROSS		REMARKS
					1ST GEAR	2ND GEAR	
1. River	Less than 10 meters	Slopes at entry & exit points are gradual & wide; no obstacles at cross- ing site; bottom firm.	Negligible	High	15 min	50 min	Capstan cross- ing not required. Whenever possible crossings should be accomplished at high tide. Negligible currents do not affect crossing time. Swift currents and width of water- way increase crossing time because of the additional effort (swimming) necessary by carriers to over- come adverse water conditions.
2. River	Less than 10 meters	Slopes at entry & exit points steep; obstacles at cross- ing site; mud bottom; soil off from river; banks firm.	Very swift	Low	60 min	120 min	Capstan not required.

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TYPE OF OBSTACLE	WIDTH	PHYS CHARS	CURRENT	TIDE	TIME REQUIRED TO CROSS		REMARKS
					1ST CAR	2ND CAR	
3. River	Less than 10 meters	Slopes at entry & exit points steep & muddy. Impassable obstacles at crossing site.	Very swift	High or Low	Cannot cross	Cannot cross	Against very swift currents, carriers maximum speed in water (3.5 mph) is insufficient to maintain headway in water & carrier will drift or broach.
Canal	5-15 meters	Same as 1. above	Negligible	High	10 min	45 min	Same as 1.
Canal	5-15 meters	Same as 2. above	Swift	Low	90 min	180 min	Often canal banks will have steeper banks than rivers & require some pioneering effort at entry & exit sites. The depth of the water in canals will affect the crossing as shallow water causes the carrier to mire in the mud bottoms.
Canal	5-15 meters	Same as 3. above	Very swift	High or Low	Cannot cross	Cannot cross	

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(C) ANNEX E

AFTER-ACTION REPORTS AND ADVISOR COMMENTS

Annex E contains after-action reports and comments as follow:

Reaction to VC Target of Opportunity, 4th Troop, 2d Squadron	E-2
Search and Destroy, 3d Troop, 2nd Squadron	E-2
Search and Destroy, 4th Troop, 2nd Squadron	E-4
Friendly Defeat, Unit not identified	E-5
Advisor Comments, Mechanized Rifle Troops, 3d Armored Cavalry Squadron	E-10
Advisor Comments, Reinforced Infantry Battalion Search and Clear Operation, III Corps	E-11

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1. REACTION TO VC TARGET OF OPPORTUNITY, 4TH TROOP, 2D ARMORED CAVALRY SQUADRON

On 26 Dec 1964, 4/2 Armored Cavalry Troop was enroute from Camau to Bac Lieu. Upon arriving at Vinh My (MR 42246) at approximately 0830, the lead carrier was stopped by a Popular Force outpost and informed that VC had constructed two roadblocks approximately 2,000 meters down the road. Popular Force soldiers had seen the VC and said they were still in the area. The troop commander was informed of this and immediately ordered his carriers to continue forward and try to locate the VC. The VC were spotted to the north of the road and running away. The troop commander ordered his platoons to turn off the road and pursue the VC. The rice paddies in this area were dry and no movement problems were encountered. The troop took the VC under fire from approximately 800 meters and continued to pursue them across the open rice fields. The troop was in a line formation. Results of this action were 12 VC KIA and 10 weapons captured. No friendly casualties were sustained. The bodies were brought back to the road and laid out for the civilians in the area to view. This had a tremendous psychological effect on the people. Since this action there have been few roadblocks constructed in this area and it is felt that the destroyed VC squad was one of the primary causes of the harassment actions in the area to date.

2. SEARCH AND DESTROY, 3D TROOP, 2D ARMORED CAVALRY SQUADRON

On 26 Mar 65, 3/2 Troop (M113) under the control of the 15th Infantry Regiment, was participating in operations near the district town of Tri Ton in the Province of Chau Doc. Operating at the base of one of the Seven Mountains known as Dop Ba Keo, the troop was advancing along a westerly axis with the 1/14 Infantry at its right flank.

At approximately 1400 the troop moved to occupy objective 8, located at the base of the mountain. The 1/14 was 1 kilometer behind and to the east of the troop.

The troop formed for the attack in the open rice paddy. Support platoon had already deployed, emplaced their three 81mm mortars, and registered on the objective with a WP round. As the remainder of the troop swept into the objective area, an estimated Viet Cong company opened fire with small arms and automatic weapons from a distance of 25 meters. The carriers returned the fire at once and, upon reaching the woodline, the attached infantry company along with several troopers dismounted and began to assault the Viet Cong positions.

Figure E-1 shows the positions of the units involved in the action.

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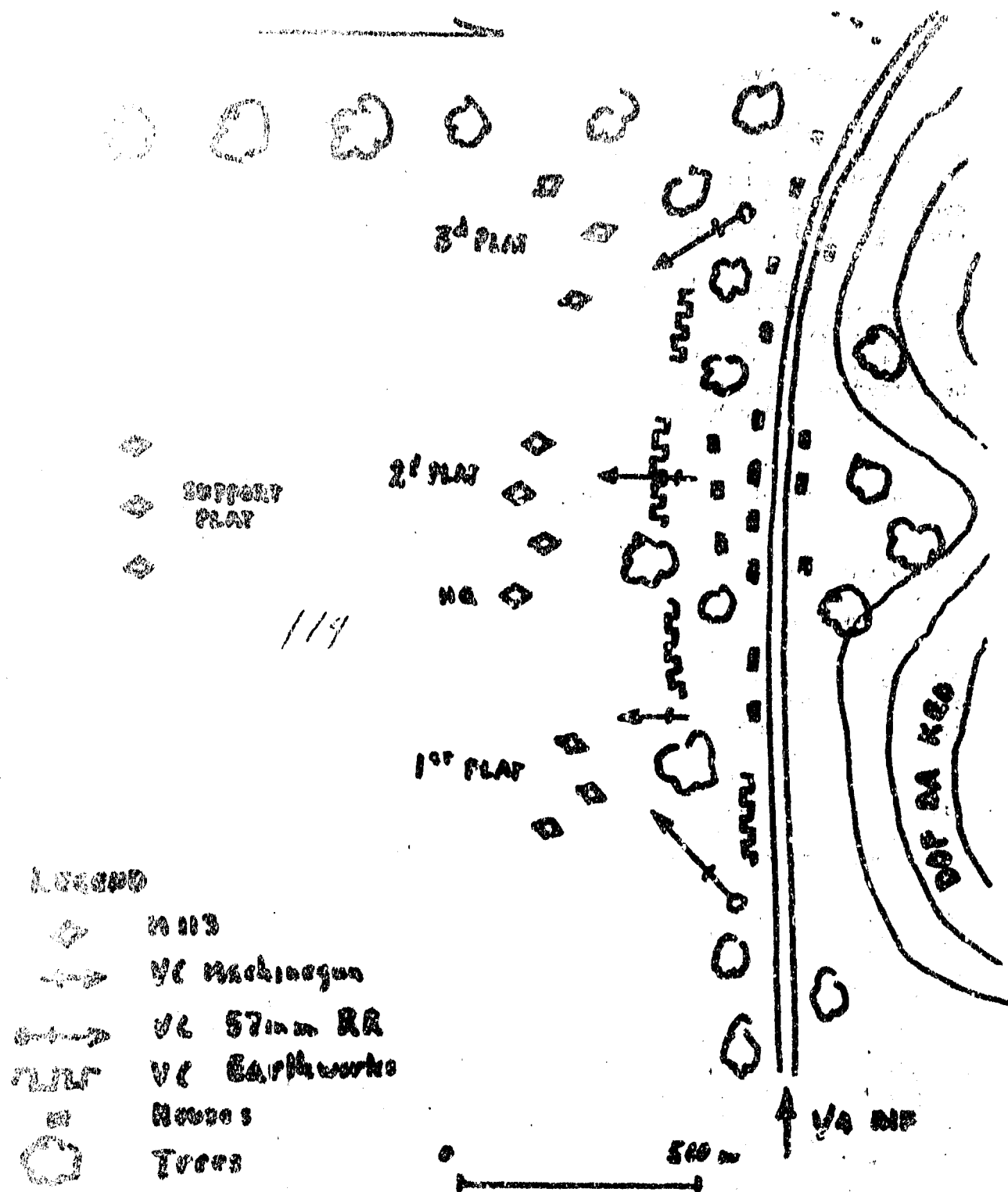


FIGURE E-1. Search and Destroy operation, 3/2 Troop, 26 March 1965.

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3. SEARCH AND DESTROY, 4TH TROOP, 2D ARMORED CAVALRY SQUADRON

The 4th Troop, 2d Armored Cavalry Squadron, participated in a search and destroy operation on 5 April 1965 in Kien Long district of Quang Thien Province. This operation, Dan Chi 129/60, was under the control of the 21st Infantry Division, and was conducted in an area the Viet Cong habitually used as sanctuary for training and rest.

The concept of operation called for the armored cavalry troop and the 1st Battalion, 31st Regiment to move along parallel axes from Kien Long (WR 287507) to vicinity of WR 218612. The 42d and 44th Ranger Battalion located at Vi Thanh (WR 518813) were the reserve which would be lifted by helicopters when suitable contact was made. Fire support was to be provided by armed helicopters and attack bombers.

The mission of 4/2 Troop was to search and destroy along an area running northwest from Kien Long for approximately 15 kilometers.

Initial contact was made on 5 April, when the VC ambushed a boat convoy enroute to Kien Long from Vi Thanh.

The troop crossed the ID, a canal, at 0715 and moved northwestward checking its assigned objectives and the surrounding area. First Company, 1st Battalion, 31st Regiment was mounted on the 4/2 Troop carriers. The remainder of the 1st Battalion was on the right, and both columns were commanded by the 4/2 Troop commander. Upon reaching the vicinity of its final objective the troop came under heavy mortar fire. The 1st Battalion was halted at its final objective. When the mortar fire began, the troop was in line formation with the three line platoons forward and the support platoon back with the two CP vehicles between. The Troop commander maneuvered the platoons to get out of the mortar fire and to try to locate the VC positions. The support platoon was moved up and began firing in an area between WR 210612 and WR 215612 with its mortars, recoilless rifles, and machineguns. The three line platoons became engaged between WR 215612 and WR 224610. VC mortars were still firing and the troop was receiving increased small arms fire. At 0935 an A1H attack bomber was shot down while on a bombing pass in the vicinity of WR 205612. The troop could not disengage and move to that location. The troop and the attached dismounted infantry assaulted the VC position unsuccessfully. The infantry was held back by heavy VC automatic weapons fire and the M113's were prevented from overrunning the VC position by an impassable ditch.

At approximately 0955 two armed helicopters were shot down in the vicinity of the downed A1H. They had been providing support for another helicopter sent to check the A1H. Shortly after this the troop had one M113 hit by a 57mm recoilless rifle HEAT round and another hit by a bazooka. One of these carriers was disabled but was evacuated safely. (Project Officer's Note: The disabled APC was hit on the left front corner

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by a 57mm HEAT projectile which penetrated the armor, destroyed the junction box by the driver's left foot, severed the driver's right foot at the ankle, went through the firewall into the engine compartment where it cut oil lines and penetrated the transfer case. There was no fire started. The vehicle continued to fight in place, though it would not run, and was towed out later in the action by another APC. The bazooka referred to was a Chicom RPG-2 82mm anti-tank rocket. The rocket hit the right side of this APC near the center of mass with about 20 degree obliquity. It penetrated the armor, leaving a hole almost 3 inches in diameter. It killed one crewman, but did no other damage. Had the effect of the jet extended far enough it would have penetrated the fuel tank. This APC continued to fight and to operate). The 1st Battalion had moved up and gone into action on the right flank. Reinforcements began arriving at 1100 with the first lift of the 4th Ranger Battalion. They passed through the support platoon, which was then moved in with the line platoons. Heavy fighting was going on everywhere and no units were able to advance. After repeated air strikes, units finally reached the canal line at 1400. Fighting was still going on in the vicinity of the downed aircraft where two companies of the 42nd Ranger Battalion had been lifted in. When units reached the canal line the VC withdrew to the north and west. Since the area was out of artillery range it was decided to withdraw rather than spend the night, and all units were clear of the area by 1915. In this operation 4/2 Troop killed 50 VC and captured 22 weapons including 1 Chicom bazooka, 3 BAR's, and 18 individual weapons. The troop had 9 killed, 24 wounded, and 2 M113's damaged.

The VC main force unit in this engagement was better equipped than those encountered before, having a large number of automatic weapons. It was also noted that they had changed their tactics in that their crew-served weapons were in the rear instead of on line with the riflemen. As a result of this, it is believed a greater fire superiority will have to be built up before assaulting, and a greater use made of napalm and white phosphorus.

4. FRIENDLY DEFEAT, UNIT NOT IDENTIFIED

The following after-action report was submitted by the US advisor of an ARVN armored cavalry squadron during the evaluation but names of persons and places and unit identification are changed for obvious reasons:

HEADQUARTERS
24th Armored Cav Sqdn
Advisory Team # 324
APO US Forces 91222

SUBJECT: After-Action Report of Phung-Thong 317 (Tung Toi)
18-19 April 1965

1. The operation was approved by the corps chief of staff at a

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planning conference held on 16 April 1965. All of the major commanders of the units to be employed were present plus their American advisors.

2. The basic plan was to advance into Tung Toi Valley with two task forces abreast: Task Force B on the north axis with the 367th Infantry Regiment minus one battalion, 200th Ranger Battalion, and three M-24 tanks. Task Force A on the south axis with the 82d Marine Battalion, 91st Division Reconnaissance Company, 1st Troop of the 22d Armored Cavalry Squadron, 1st Troop of the 24th Armored Cavalry Squadron and the squadron headquarters of the 24th Squadron as the command group. The plan called for air and artillery support for both axes, each using a different air-ground net. The 2d battalion of the 367th Infantry Regiment and other lesser units were to be employed in a blocking force role.

3. Task Force A planning was conducted at squadron headquarters at 1530 hours on 16 April 1965. The Squadron Commander (Lt Col Bong), the Executive Officer, the S-2, the S-3, Captain Williams, Sgt Brown, and myself were present and had an active role in the planning (as advisors only). Task Force A was organized into three teams; Team 1, two companies of Marines; Team 2, 1/24 Troop and 91st Recon Company; Major Quat, Squadron Executive Officer commanding; Team 3, 82d Marine Battalion (-) and 1/22 Troop, Major Phat, 82d Marine Battalion Commander commanding (Reserve).

4. Squadron Headquarters departed Quai Ian at 1200 hours 17 April and arrived in Dop Be at 1500 hours. The squadron staff and US advisors attended a final briefing at 91st Division forward command post; no changes were made to the basic plan.

5. Task Force A departed Dop Be 180605 April and was marched to Bu Lai District headquarters. All elements closed in the assembly area at Nhuan at 180730, April. At 0715 hours F4B's, F100's, B57's, and A1E's started their air strikes which lasted until 0835. Aircraft were to hit all known VC positions with napalm, 250 pound fragmentation bombs, rockets, and 20mm cannon. Teams 1 and 2 crossed the LD at 0835 hours; Team 1 on the left, Team 2 on the right, and Team 3 following at 500 meters as reserve.

181002 April - Everything going according to plan. Team 1 (two companies of Marines) progressing without contact. Team 2 has received only a few rounds of sniper fire.

181045 - L-19 reports that a large number of VC are in trenches vicinity (Coordinates). A1E's on station over Dop Be were called to hit enemy positions. They answered our call and were hitting targets with bombs and 20mm cannon within three minutes.

181100 - Team 2 made contact at (one of coordinates just hit by A1E's), came under heavy 82mm mortar, 57mm recoilless rifle, and automatic weapons

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fire. Elements withdrew to covered positions. One M113 in 1/24 Troop was damaged by a 57mm RR, with one KIA and one MIA. Team 1 was ordered forward to make contact and to determine extent of enemy positions.

181120 - Team 1 made contact on left flank. We now estimated the VC to be one battalion reinforced with heavy weapons.

181130 - Team 3 (Reserve) ordered forward to a position just to the rear of Teams 1 and 2.

181145 - Team 3 commander reports to Lt Col Bong that he has no radio contact with 1/22 Troop. Bong tries to contact 1/22 Troop with negative results.

181220 - Team 1 attacks and secures wood line to our front.

181230 - Heavy automatic weapons and 57mm RR fire vicinity (other coordinate hit by AR's at 1048). 1/22 Troop got lost and blundered into the VC position from the left rear and suffered 5 killed, 18 wounded, and 3 M113's damaged by 57mm RR. This engagement lasted 20 or 30 minutes.

181300 - Lt Col Bong was trying to determine exact position of 1/22 Troop; their position blocked from our view by VC held hills.

181400 - Two companies of Marines with 1/24 Troop sent around VC left flank to reinforce 1/22 Troop. When they arrived, 1/22 Troop had returned to the CP in violation of Task Force orders. The 82d Marine Battalion (-) was committed to the left flank after the first assault failed. The 91st Division Recon Company and 1/22 Troop were to hold the right portion of the area, med-evac their wounded, and be prepared to reinforce assault forces on order.

181800 - The fourth assault by the 82d Marine Battalion reinforced with 1/24 Troop carried the position. By then the VC had been able to carry away most of their dead, wounded, and weapons. Lieutenant Jones, advisor to 1/22 Troop, reported that there were 60 to 70 VC bodies and weapons in the objective area after their first assault. From blood stains and bloody field dressings found in the objective area, I am inclined to believe this report.

181900 - Task Force reorganized for the night at (coordinates). They expected a mortar attack that night, which did not materialize.

190800 April - 82d Marine Battalion secured Objective 1.

191200 - 1st Battalion (-) of the 80th Infantry Regiment arrived from Hill 30 to reinforce Task Force A.

191230 - Task Force A elements moved out to secure Objectives 4 and 5,

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by-passing Objective 1 which was cleared earlier by the Marine battalion. Teams now organized as follows: Team 1, 82d Marine Battalion and 1/24 Troop; Team 2, 1/80 Infantry Battalion (-); Team 3, 91st Division Recon Company and 1/22 Troop. Task Force advanced with two teams abreast; Team 1 on the left, Team 2 on the right, and Team 3 following in reserve.

191530 - Objective 4 secured; no contact.

191600 - Objective 5 secured. Lt Hertz (Marine advisor) reported seeing several groups of VC in the foothills moving east. Some groups had 10 or 12 people. One group appeared to have about 100. On inspecting Objective 5, we found a complete trench system with heavy weapons emplacements.

191635 - L-19 reports "many many VC" in village to our left front.

191645 - Artillery was called in on the VC village, and after approximately 20 rounds, Lt Col Bong started organizing the task force for the assault. Two companies of Marines reinforced with 1/24 Troop were to attack the left flank of the village. 1/22 Troop and 1/80 Infantry (-) were to protect the right flank and give supporting fire. The 82d Marine Battalion (-) (two companies) were reserve.

191706 - The attack was launched. The assault elements progressed across the paddy with infantry leading and M113's moving slightly behind the head elements. When the ARVN units pushed to a point about 60 meters from the woodline of the village, the VC opened fire with 82mm mortars, 57mm RR, and very heavy automatic weapons fire. The assaulting elements stopped and started falling back. The M113's of 1/24 troop pulled back to get out of the direct line of 57mm RR fire. The infantry saw this and started to fall back faster. The VC then counterattacked from the front and both flanks. The 1/24 Troop then broke for cover in an area about 1500 to 2000 meters from the initial assault position. This move was made against the order of the Task Force Commander. The company commanders of the Marines bugged out with the APC's leaving the troopers (Marines) with only the sergeants and corporals to lead them. The Marines started to pull back into the trench of Objective 5. Some M113's from 1/22 Troop plus the two squadron headquarters tracks gave them covering fire. The VC then drove into their left flank, turning it. Major Johnson (Marine battalion advisor) and his counterpart moved forward to try to organize the Marines left on Objective 5. Lt Col Bong was trying to contact his elements on the radio, but no one would answer. By now, there was only one company of Marines and five APC's engaged in the fire fight. This delaying force was in danger of being cut off from both flanks, so they started withdrawing -- the Marines by squads, and the five APC's covering. Lieutenant Hertz (Marine advisor) was hit early in the counter-attack. Lieutenant Jones (1/22 advisor) was hit during the withdrawal. As we withdrew toward the main part of our Task Force element, we continued to receive mortar, 57mm, and automatic weapons fire from three

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sides. By now there was little control and no fire discipline. At 1735 hours the Senior Advisor, 24th Squadron, was wounded. Captain Williams, Staff Advisor, joined Lt Col Bong to aid in getting the forces organized and to move toward Objective 3, which was held by Task Force B. As elements of Task Force A closed on Objective 3, the VC fell back and continued to fire from three sides. The units of Task Force B, upon seeing this, also started to withdraw. Lt Col Bong, Williams, and one or two other US advisors tried to stop the withdrawal and organize a defense. No one would listen to them. Captain Williams was wounded at this time. Bong and Johnson were able to stop most of the elements on the road somewhere east of Objective 3. Some sort of order was restored and both task forces withdrew to Hill 30. The VC had stopped their pursuit east of Objective 3. Two days later ARVN units were sent back into the area. They recovered the dead and two wounded. No weapons were recovered and no contact made with the enemy. The VC had withdrawn from the area stripping it clean of all brass, weapons, boots, and clothing. The Vietnamese lost 26 KIA, 86 WIA, and 29 MIA. Two M113's were destroyed, and three 60mm mortars, one 57mm RR, and numerous small arms lost. VC losses were unknown; however ARVN claimed 350 VC killed for both days.

6. Conclusions:

a. During the final attack the Task Force commander did not have radio communication with the artillery or air.

b. The commander of 1/24 Troop did not go with the troop during the attack; therefore, had no control when the VC countered. When he did rejoin his unit he failed to do anything, so the troop remained leaderless for the entire withdrawal.

c. There was a lack of discipline and leadership of all ranks in this unit while in garrison and during combat; i.e. you cannot be party buddies in garrison and then turn commander in the field.

d. There was a lack of battle drill in all troops of this squadron.

e. Officers in this unit cannot receive an order without talking about it for 30 minutes.

f. There is a lack of "will to win" in this unit.

7. This advisor on his return from the hospital made a recommendation to Lt Col Bong that he take strong steps in restoring discipline in his officer ranks, and train all units in battle drills (ambush, attack, counter-attack, and defense). Also, retrain all units in communications and fire discipline. As of this date nothing has been done to correct the situation.

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This advisor feels after working with the 24th Armored Cavalry Squadron for 11 months and participating in 46 operations with its units that the NCO's and soldiers, if properly led, would give an excellent account of themselves in battle. Several times I have seen them turn and follow an American advisor in attack when their own officers were indecisive. The weakness in this unit is the lack of discipline, leadership, and "will to win" within the officer ranks.

s/Robert R. Arnold
t/ROBERT R. ARNOLD
Major, Armor
32, 24th Arm Cav Sqdn

5. ADVISOR COMMENTS, MECHANIZED RIFLE TROOPS, 3D ARMORED CAVALRY SQUADRON

The advisor with 3/3 Troop considered the mission assigned that troop appropriate, but he found that the troop employed the M113's more as tanks than as mechanized infantry carriers. Rarely did the rifle-men of this troop dismount and fight on foot. Infantry or Ranger companies habitually attached for operations rode the APC's to contact and then dismounted and fought on foot with the APC's providing close fire support. The commander of this troop was very aggressive and handled the unit well. He employed his 81mm mortars whenever possible. The troop always used either the line or wedge formation in assaulting objectives and the machine gunners fired short bursts in contrast to most other Vietnamese Armor units which frequently fired "bursts of belts". This troop, as part of a larger force, had a road security mission along Routes 1 and 19. The M113 troop did not constantly patrol the highway but remained on alert in central locations ready for immediate use within a specified sector. The troop would move from one location to another, remaining in each area for several days.

An advisor with an ARVN battalion in III Corps had this to say about the M113 troop with which his unit operated:

All APC's are heavily armed with either 57mm recoilless rifles, caliber .50 machineguns, or caliber .30 machineguns, and carry up to five basic loads of ammunition. So much ammunition and personal equipment is being carried that the original employment of a mechanized rifle company has been discarded. The troop is not up to strength in riflesmen and even if it were there it wouldn't be enough space for them to ride. Their rifle strength is about 35 now but they rarely dismount. When used with our dismounted infantry, the APC's follow our troops by bounds, much as tanks would.

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On a typical search and clear operation, as the battalion approaches a hostile village, it receives sniper fire. After entering and searching the village no men or weapons are usually found, yet when we leave, the battalion is again sniped at from the former village or from the next one.

Since firm resistance is rarely met, the APC's are seldom committed from behind the dismounted infantry. When they are committed it is usually in a fire support role.

I don't believe the capabilities of the APC's are being exploited. Their speed of movement through rice fields and the shock effect of the M113 on the guerrillas armed only with small arms could be significant.

I have urged the battalion commander to try different tactics with the APC's, such as: Without waiting to receive fire from a village, commit the APC's with maximum speed to surround it at a distance of about 200 meters to keep the VC from slipping out and hiding in the rice fields as the infantry approaches. Then our dismounted infantry could move in for a thorough search of the village and close-in rice fields. But the Vietnamese commanders that I've seen aren't prone to change their tactics unless there is a pressure from above.

6. ADVISOR COMMENTS, REINFORCED INFANTRY BATTALION SEARCH AND CLEAR OPERATION, III CORPS

This action, which occurred in the Spring of 1965, was a search and destroy operation in III Corps. An M113 troop was attached to an ARVN infantry battalion whose mission was to proceed to a certain location and destroy several bunkers reportedly in use by the VC. The plan called for the M113 troop, carrying engineers with demolition charges, to lead the assault followed closely by the infantry. When the assault began it became apparent that the VC bunker complex was more extensive than reported and that the designated objective included only a minor part of the complex and did not contain the bulk of the VC. The APC's arrived at the designated objective but the fire from the adjacent VC positions was so intense the accompanying infantry had to withdraw. The APC troopers dismounted, protected somewhat by their carriers, placed charges, and destroyed the bunkers on the assigned objective, all the while taking casualties from the VC small arms fire. When this was done the troop withdrew to the infantry position. The troop advisor tried to get the troop commander to attack the VC force which had been firing on them. The VC were in positions from which they had no covered or concealed routes of withdrawal and were apparently a force inferior to the ARVN force but the ARVN commander, who was known to be courageous, declined, saying he did not have the authority. The APC troop advisor called the supported infantry unit advisor requesting him to ask his counterpart to give the necessary

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order. The infantry commander also refused, saying he would need approval from the regimental commander (whose "field" CP for that operation was in a town over 10 kilometers away). The APC troop advisor rallied the regimental advisor, explained the situation, and asked him to try to get the necessary order issued. The regimental advisor attempted to do so but the regimental commander claimed that he had communications difficulties and couldn't contact the battalion commander on the ground. The task force returned to their home station, claiming success in their operation. Later the troop advisor asked the ARVN rifle battalion why he had not in any event ordered the APC troop to assault the clearly outnumbered and outgunned VC. His revealing answer was, "I can't order armor".

EVALUATOR'S COMMENT:

Such a statement from a commander is indicative of the restrictive influence Armor Command has exerted on the employment of armor units and the acceptance of this influence by field commanders. The combination of these attitudes and relationships was baffling and frustrating to American advisors who were steeped in the concepts "destruction of the enemy" and "flexibility". The net effect of these two ARVN peculiarities was a violation of the principles of Objective and Unity of Command.

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(U) ANNEX F

CHARACTERISTICS OF VIET CONG
ANTI-ARMOR WEAPONS

The information contained in this annex is taken from the second edition of "Weapons, Ammunition, Mines, and Booby Traps used by the Viet Cong South of the 17th Parallel", a handbook published by RVNAF High Command J2.

Chicom 57mm HEAT Recoilless Rifle Shell, Armor Piercing, HE	F-2
Russian Anti-Tank Rocket Launcher, Model RPG 2	F-3
Viet Cong Anti-Tank Locally Made Parachute Hand Grenade	F-4
Anti-tank Shaped-Charge Parachute Hand Grenade, Model RKG	F-5
Viet Cong Cast Iron Fragmentation Anti-tank Mine	F-7
Viet Cong Locally Constructed 100mm Anti-tank Mine Made From British 100mm Mortar Shell	F-8
Viet Cong Pressure-Type Anti-tank Mine	F-9
Viet Cong Betel Box Shaped Mine, Locally Made of Cement	F-10

1. CHICOM 57mm RECOILLESS RIFLE SHELL. ARMOR PIERCING, HE

A Chicom 57mm RR cartridge (7. pure F-1) looks like that of US manufacture. The cartridge bears US nomenclature and markings but the two types are different in the following characteristics:

US

a/ Fuze: Carved with lot number and the year of manufacture. There are no holes on the surface of the fuze body.

b/ Projectile: Painted OD with precut rotation band, the shell nomenclature is properly marked (in yellow color).

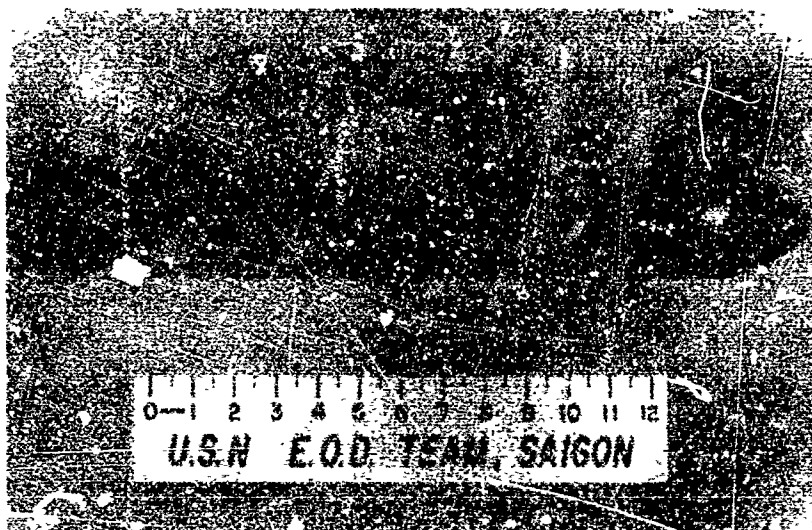
c/ Case: Meticulously made, smoothly painted, with the projectile held firmly by four stamped indentations.

Chicom

a/ Fuze: No lettering, two holes in the fuze body opposite each other (perhaps to tighten the fuze to the shell). Its head is covered by a disk preventing humidity from entering the fuze.

b/ Projectile: Longer (measured from the case opening to the fuze end) than US shell approx. 15mm, smoothly painted, precut rotation band is 2mm shorter, not meticulously made, improper nomenclature, painted in yellow letters.

c/ Case: Approx. 4mm longer. Hat of US. Four slots on the cartridge case neck, painted dark, is rudimentarily fabricated since rough case fitting lines are still present.



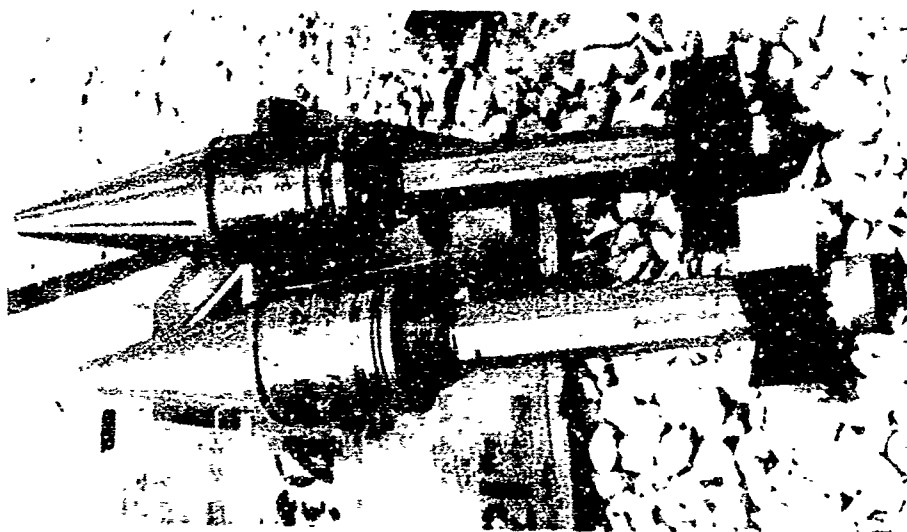
(U) FIGURE F-1. Chicom 57mm recoilless rifle shell.

2. RUSSIAN ANTI-TANK ROCKET LAUNCHER, MODEL RPG 2

This weapon (figure F-2) is a smooth bore, recoilless anti-tank rocket launcher. Practically, this weapon is of the same value as the US and British HE/anti-tank rocket launchers. When loading, the stabilizing fins of the projectile are placed in the muzzle of the gun, and the largest portion of the projectile will fit in the grooves of the gun muzzle and firmly hold the projectile. The projectile head, 82mm in diameter, is placed outside of the gun barrel. A gas port is located on the right side of the gun near the hand bar. This weapon therefore cannot be placed on the left shoulder for firing.

Half of the rocket launcher is covered with insulation to protect the gunner's face and shoulder from heat.

Caliber	82mm
Weight	6 pounds
Muzzle velocity	276 fps
Rate of fire	4 to 6 rpm
Type of ammunition	HE, anti-tank ammunition
Weight of ammunition	3.3 pounds
Penetration	6 to 7 inches
Sight	Stationary front sight Rear sight made of sheet metal, folding type, and is installed with 3 sight holes 50, 100, and 150 meters range.



(U) FIGURE F-2. Communist anti-tank rockets.

3. VIET CONG ANTI-TANK LOCALLY MADE PARACHUTE HAND GRENADE

This is a shaped charge grenade, 8-3/4 inches in length and 1-1/2 pounds (approx) in weight. It is composed of 4 parts:

a. HEAD: The head is cylindrical and made of 7.10mm sheet iron. This cylinder is 3 inches (approx) in diameter and its height depends on the angle of the hollow cone and the quantity of TNT.

b. BODY: The body is a cylinder made of sheet iron and consisting of:

(1) A cone made of brass with a thickness of from 2 to 3 mm. It is designed to create a penetrating jet against tanks and armored personnel carriers.

(2) TNT housing.

(3) One, 1 to 2 mm thick partition of cardboard or wood used to regulate the explosive action against the surface of the cone base.

(4) Cast TNT which has a 1.55 density and is used as the main charge. The strong destructive power of the grenade is due to this cast TNT.

(5) One detonator containing silver fulminate.

(6) One primer of Chicom K .50 SMG cartridge.

c. PARACHUTE CONE: This cone is made of sheet iron. It is used to lock the safety spring when the grenade is in its safety position and is also used as the cone of the parachute when the grenade is thrown. The inside of the cone of the parachute consists of the following parts:

(1) Safety spring

(2) Firing pin

(3) Safety pin and spring

(4) One element of the parachute with sheet iron is attached to the wooden handle by a piece of cloth at each side.

(5) Parachute spring used to unfold the parachute.

d. TAIL: The tail is a cylindrical wooden handle equipped with a parachute lock made of sheet iron and a locking pin lying across the handle.

3. VIET CONG ANTI-TANK LOCALLY MADE PARACHUTE HAND GRENADE

This is a shaped charge grenade, 8-3/4 inches in length and 1-1/2 pounds (approx, in weight. It is composed of 4 parts:

a. HEAD: The head is cylindrical made of 7.10mm sheet iron. This cylinder is 3 inches (approx) in diameter and its height depends on the angle of the hollow cone and the quantity of TNT.

b. BODY: The body is a cylinder made of sheet iron and consisting of:

(1) A cone made of brass with a thickness of from 2 to 3 mm. It is designed to create a penetrating jet against tanks and armored personnel carriers.

(2) TNT housing.

(3) One, 1 to 2 mm thick partition of cardboard or wood used to regulate the explosive action against the surface of the cone base.

(4) Cast TNT which has a 1.55 density and is used as the main charge. The strong destructive power of the grenade is due to this cast TNT.

(5) One detonator containing silver fulminate.

(6) One primer of Chicom K .50 SMG cartridge.

c. PARACHUTE CONE: This cone is made of sheet iron. It is used to lock the safety spring when the grenade is in its safety position and is also used as the cone of the parachute when the grenade is thrown. The inside of the cone of the parachute consists of the following parts:

(1) Safety spring

(2) Firing pin

(3) Safety pin and spring

(4) One element of the parachute with sheet iron is attached to the wooden handle by a piece of cloth at each side.

(5) Parachute spring used to unfold the parachute.

d. TAIL: The tail is a cylindrical wooden handle equipped with a parachute lock made of sheet iron and a locking pin passing across the handle.

OPERATION:

Before throwing, firmly hold the wooden handle and the parachute lock, then pull out the pin from the handle and throw the grenade.

When thrown, the spring pulls the parachute cone to the rear and the parachute deploys. The parachute will stabilize the direction of the grenade and assure proper impact attitude on the target. At the same time the cone moves rearward and the spring pulls the safety pin out of the grenade and allows the firing pin to strike the detonator.

Upon impact, due to the inertia, the firing pin strikes the detonator and explodes the grenade.

EFFECTIVENESS:

Piercing power: up to 100mm of steel.

If the grenade hits the track or the engine of an APC, the APC will be disabled.

If it hits the personnel compartment, the penetrating effect of the jet will cause heat and high pressures and cause casualties aboard.

DISASSEMBLY OF GRENADE:

1. Before the grenade is thrown: The removal of the safety pin is easy and not dangerous since the firing pin strikes the detonator by inertia only. To remove the safety pin assembly, remove the parachute lock first.

After the parachute assembly has been disassembled, never let the grenade fall head down on the ground since it will create the inertia causing the firing pin to strike the primer and exploding the grenade. (Disassembly must be done by a ordnance specialist).

2. Dud grenade: It is absolutely prohibited to touch this grenade, since it may explode unexpectedly. Report it to an ordnance specialist for disposition.

4. ANTI-TANK SHAPED-CHARGE PARACHUTE HAND GRENADE MODEL RKG

This type of grenade (figure F-3) is believed to be a Russian product because the meaning of the letters RKG in the Russian language is as follows:

R : Hand
K : Armor defeating (destruction of tank)
G : Grenade

It is cylindrical and made of tin. The grenade is used against tanks and APC's and explodes at a low impact angle. It is composed of three different components: Body of the grenade, fuze, and handle, which are kept separately and assembled just before use.

a. BODY

Diameter	3 inches (approx)
Weight	2 pounds (approx)
Length	7 inches (approx)

The charge is cast TNT. At the head of the body is a fuze well. The fuze is attached to the grenade prior to use.

b. HANDLE

Diameter	2 inches (approx)
Weight	1 pound (approx)
Length	7 inches (approx)

It is composed of the following parts:

- (1) Firing pin located inside the handle.
- (2) Safety pin.
- (3) Parachute.
- (4) Parachute spring.
- (5) Two pieces of aluminum of half cylindrical shape used to hold the parachute when folded.
- (6) Safety lever.
- (7) Closing cap.

CHARACTERISTICS

Overall weight	3 pounds (approx)
Weight of body	2 pounds (approx)
Weight of handle	1 pound (approx)

Penetrating power: Up to 130mm of steel
Effective fragmentation radius: 150 meters (approx)

OPERATION:

To use this type of grenade, tightly hold the handle and pull out.

the safety pin. When thrown, the spring ejects the parachute holding cap (at the head of the handle) to the rear and the recoil spring ejects the parachute out of the handle. The parachute stabilizes the grenade.

Upon impact, the inertia activated firing pin moves forward and strikes the detonator and detonates the grenade.

a. Assembly:

Hold the body of the grenade in the hand, place the fuze in the hole at the head of the body, then screw the handle firmly into the grenade body. Thus the grenade is ready for use.

b. Disassembly:

Follow the above procedure in a reverse manner. Disassembly is possible only when the grenade is intact and has not been thrown. Note: It is absolutely forbidden to touch a dud grenade since it may unexpectedly explode. It is necessary to report to ordnance specialists for disposition.

ADVANTAGE:

The grenade has approximately the same effects on armor as RR ammunition (HEAT).

DISADVANTAGE:

Sensitive, thus avoid shock. Attach the fuze and screw the handle into the body before use only. Avoid throwing the grenade at targets where there are obstacles.

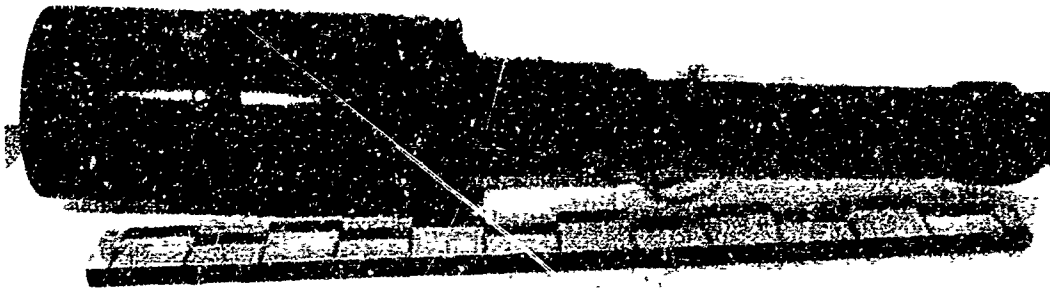
COMMENTS:

This grenade is designed not only for use against tanks and APC's but also against blockhouses, posts, vessels, especially POM and infantry troops.

5. VIET CONG CAST IRON FRAGMENTATION ANTI-TANK MINE

This oval-shaped mine is criss-crossed by serrations except on the two ends. On the mine body and between both ends is a handle which is passed through two eye hooks attached to the mine body.

There is a hole, 2 inches (approx) in diameter, with a cover at the end of the mine. When used, this cover is removed and replaced by an electric blasting cap.



(U) FIGURE F-3. RKG parachute hand grenade.

CHARACTERISTICS

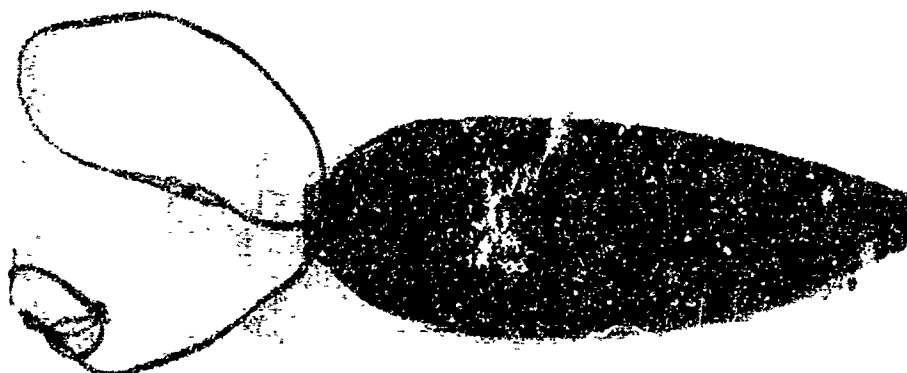
Color	Grey (cast iron)
Overall weight	12 pounds (approx)
Length	9 inches (approx)
Diameter	5 inches (approx)
Explosive charge	Melinite
Operation	Electric

6. VIET CONG LOCALLY CONSTRUCTED ANTI-TANK 100MM MINE MADE FROM BRITISH 100MM MORTAR SHELL

This mine (figure F-4) is a modified British Mortar shell using an electric firing device.

The fuse well is cut off and a hole is drilled into the explosive to accomodate an electric blasting cap.

Oval-shaped case, 100mm in diameter, and 370mm in length.



(U) FIGURE F-4. Viet Cong 100mm anti-tank mine.

CHARACTERISTICS

Color	Black
Overall weight	13 pounds (approx)
Explosive weight	TNT
Charge weight	3-1/2 pounds (approx)
Mine case weight	10 pounds (approx)
Mine case mixture	Cast iron

7. VIET CONG PRESSURE-TYPE ANTI-TANK MINE

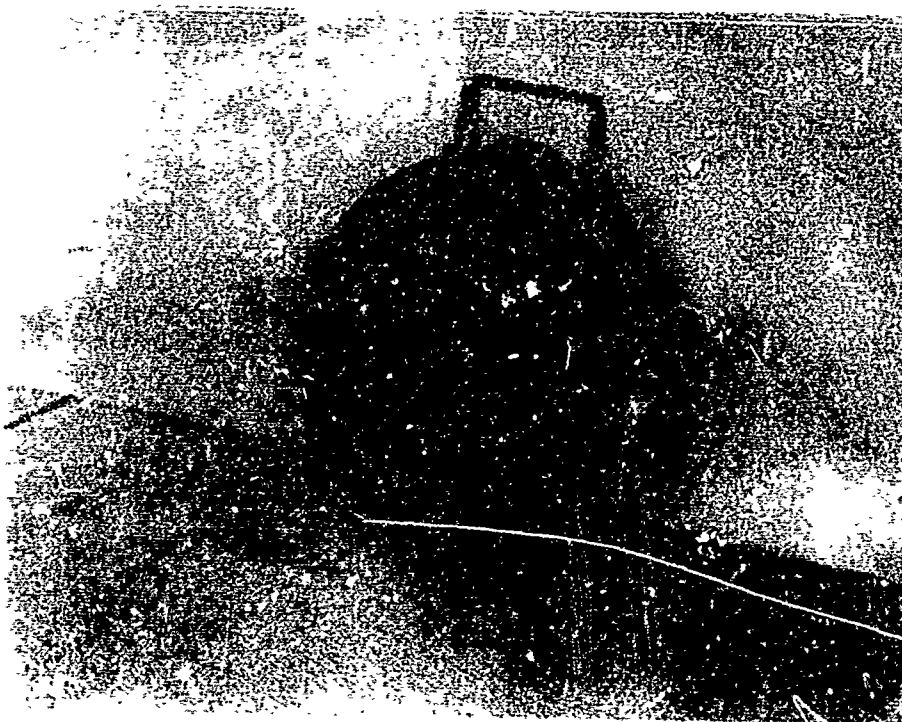
The VC locally constructed, anti-tank mine (figure F-5) weighs 11-1/2 pounds (approx) with iron case, and consists of:

a. MINE CAP:

(Pressure plate) Oval shape and having a hole in the center to accomodate the 25mm diameter fuse.

b. MINE BODY:

The mine body is 70mm high, 185mm in diameter, and its top 200mm in diameter. Two holes are located in the top: one accomodating



(U) FIGURE F-5. Viet Cong pressure-type anti-tank mine.

the fuze, the other for loading the explosive.

CHARACTERISTICS

Color	OD
Overall weight	11-1/2 pounds
Diameter	8 inches
Height	3 inches
Explosive charge	TNT
Material of mine body	Sheet iron

8. VIET CONG BETEL BOX SHAPED MINE, LOCALLY MADE OF CEMENT

This mine (figure F-5) is constructed of cement with an electric firing device, 13 pounds (approx) in weight, and has serrations in the center of the case. The end of the mine has a piece of iron attached by four bolts for holding the electric blasting cap.

CHARACTERISTICS

Color	Grey
Overall weight	13 pounds (approx)
Explosive charge	TNT



(U) FIGURE F-6. Viet Cong cement mine.

CHARACTERISTICS (Contd)

Diameter	8 inches (approx)
Mixture of mine body	Cement
Operation	Electric

(U) ANNEX G

PROGRAMS OF INSTRUCTION, ARVN ARMOR SCHOOL

Programs of Instruction for Armor Units, 1965	G-2
Detailed Program, Armor Officer Basic Course	G-8

PROGRAMS OF INSTRUCTION FOR ARMOR UNITS
ARVN ARMOR SCHOOL

COURSES IN CY 1965

COURSES	DATE OF OPENING AND CLOSING.	NR OF UNITS PROGRAMMED.	TOTAL OF TRNG HOURS	TOTAL OF HRS OF TA: EACH STUD NT OF OF EACH : COMMITTEE: THE COURSE.	EXPENDITURE FOR COURSE : IN CASH : COURSE :
COMPANY CMDR.	5 Jul - 30 Sept	12	528 hrs (12 wks)	Gen Sub: 101 Tact: 240 Wpn: 64 Auto: 60 Commo: 29 Misc: 34	OC : 200\$ NCO: 150\$ Edu: 1.0\$ (Tng : irements Office Supplies)

PURPOSE: To train the armor Off to assume the functions of:
- Co Cmdr.
- Sqdn Staff Officer (Temporary)
- And to present Military instruction to the Co & Sqdn Personnel.

(1)	(2)	(3)	(4)	(5)	(6)
ARMOR BASIC OFF	19 Oct 64 - 18 Mar 65.	22	880 hrs 20 weeks	Gen Sub: 95 Tact: 328 Wpn: 160 Auto: 175 Commo: 58 Misc: 64	Same as above

PURPOSE: To train the student to be capable of commanding an armor platoon and to be responsible for training of the platoon personnel.
- Graduated Off from National Military Academy and the NCO Nha Trang Tng Center
- Officers transferred to the Armor Branch.
- Armor NCO's promoted to Junior Officers.
- Reserve Officer Cadets (Grade II of the Tng)

1	2	3	4	5	6
PLATOON LEADER	5 Apr - 19 May	15	264 Hrs	Tact: 158	same as above.
REFRESHER			(6 Wks)	Wpn: 33	
				Auto: 46	
				Commo: 9	
				Misc: 18	

PURPOSE: To train Armor Officer who have been certified as platoon leaders prior to 1962.

1	2	3	4	5	6
BASIC ARMOR NCO	14 Dec 64 - 20 Mar 65	29	528 Hrs	Gen Sub 95	same as above
	15 Mar - 12 Jun	90	(12 Weeks)	Tact: 118	
	10 May - 7 Aug	30		Wpn: 127	
	5 Jul - 2 Oct	25		Auto: 94	
	30 Aug - 27 Nov	25		Commo: 40	
	25 Oct - 29 Jan 66	25		Misc: 54	

PURPOSE: To train Reserve and Active NCO students after completing the Basic Mil Tng Phase I to become Armor NCO's to have the capability of commanding a section.

1	2	3	4	5	6
B.1 ARMOR NCO	20 Sep - 18 Dec	27	528 Hrs	Gen Sub: 85	same as above.
			(12 Weeks)	Tact: 152	
				Wpn: 119	
				Auto: 106	
				Commo: 35	
				Misc: 40	

PURPOSE: To train NCO's having completed the G32 Armor Course to become specialist cadre in order to be capable of assuming the function of Deputy Platoon Leader, and to train soldiers in the unit under the control of an Officer.

1	2	3	4	5	6
B.2 ARMOR NCO	6 Sep - 18 Dec	20	515 Hrs : (14 Wks)	Gen Sub: 77 : Tactics: 231 : Wpn: 103 : Auto: 118 : Commo: 28 : Misc: 59	Same as above.

PURPOSE: To train Armor NCO's after completing the B.1 Armor Course to command an armor platoon. To operate a Specialist Workshop, and to train soldiers in the unit (Company level).

1	2	3	4	5	6
CC.2 REPAIR	31 May - 14 Aug : 18 Oct - 31 Dec	20 : 20	420 Hrs : (10 Wks)	Tact: 31 : Wpn: 11 : Auto: 321 : Commo: 08 : Misc: 49	Same as above.

PURPOSE: To train Armor NCO to become Sqn and Co Mechanics in order to repair and maintain vehicles in an armor sqdn.

1	2	3	4	5	6
CC.1 VEH CMDR	12 Apr - 19 Jun : 5 July - 11 Sept : 4 Oct - 11 Dec	25 : 25 : 25	378 Hrs : (9 Wks)	Auto: 133 : Wpn: 121 : Tact: 58 : Commo: 24 : Misc: 42	Same as above

PURPOSE: To train NCO's and experienced Plt to command a Vehicle in the platoon (Recon or Tk).

1	2	3	4	5	6
CO.1 (M.41).	3 May - 10 Jul 30 Aug - 6 Nov	16 18	378 Hrs (9 Wks)	Auto: 298: Wpn: 20: Tact: 31: Commo: 9: Misc: 20:	Same as above

PURPOSE: To train armor specialists to act as assistant mechanics and maint personnel.

1	2	3	4	5	6
M.41 TANK MECHANICS:	26 Apr - 5 Jun 18 Aug - 9 Oct	20 20	352 Hrs (8 Wks)	Tech: 44: E.M.: 84: Repair: 132: Driving: 18: Commo: 18: Wpn: 52: Misc: 4:	Same as above.

PURPOSE: To train armor Unit Mechanics in repair and maintenance of the M.41 Tank.

1	2	3	4	5	6
M.41 CONVERSION:		1 Co: 198			
	22 Mar - 3 May 2 May - 17 Jun 27 Jun - 12 Aug 19 Jul - 9 Sep 23 Aug - 14 Oct	Co: 2/5 Co: 3/5 Co: 1/5 Co: 1/4 Co: 1/3	288 Hrs (6 Wks)	Auto: 108: Wpn: 170: Tact: (Con- current tng w/Range firing). Misc: 10:	Same as above

- PURPOSE:
- 1/ To convert from the M.24 to the M.41 Tank.
 - 2/ To provide personnel of M.24 Tk Co w/the required tng imphasis placed on: Automotive, M.41 Turret, firing of the 76mm Gun, and the difference between M.24 Crew duties and M.41 Crew Duties.
 - 3/ To concurrently train the unit in Co tactics using the M.41 Tank.

1	2	3	4	5	6
M.113 NEW UNIT:	1 Feb - 24 Jun	1Co 198:	Actually, the tng is programed only		
	1 May - 24 Sep	1Co 198:	for phase I. Students will be		
	1 Aug - 23 Dec	1Co 198:	trained in their speciality and fol-		
	1 Nov 65 - 27 Mar 1966	2Co 396:	low these POY's (as phase I)		
			M.113 Off (Special) 6 Wks (288 Hrs)		
			M.113 NCO (Special) 6 Wks (288 Hrs)		
			M.113 Driver 6 Wks (288 Hrs)		
			M.113 Repair 4 Wks (176 Hrs)		
			M.113 A.I.T. 6 Wks (288 Hrs)		
			The POI (phase II: 8 Wks o" 44 Hrs)		
			will be made later.		
M.113 REFRESHER	15 Feb - 17 Mar	Co:3/1	192 Hrs:	Gen Sub 28	
		198		Specialist	
				Tng: 164	

PURPOSE: To provide all personnel of M.113 APC Co's periodically with a refresher training in order to be capable of:

- Using new weapons and materials.
- Carrying out basic tactical missions of the Cav Troop.

1	2	3	4	5	6
A.I.T.	Not Firm		288 Hrs	Gen Sub: 48	Came as above
	10 Courses	30-50	(6 Wks)	Auto: 60:	
	Have been proposed:			Wpn 98:	
	for CY 65.			Tng: 47:	
				mo: 12:	
				misc: 23:	

PURPOSE: To provide AIT tng to volunteers and draftees (2nd phase) who will be assigned to the Armor Branch in order to perform as:

- M.113 Rifle Men
- Replacement for the Gunner as required.

1	2	3	4	5	6
M.41 Instruu-	20 Jan - 22 Mar 65: 50		Same as M.41 Conversion.		
tcr					

CC2 APC SFC. LDR.	Feb - 31	March	17	308 hrs	Gen Sub: 17	
	May - 23	June	20	(7 weeks)	Tactics: 124	
	1. Oct - 8	Dec	20		Auto: 67	
					WPS: 48	-11-
					Commo: 16	
					Misc: 36	

PURPOSE: To train NCO's having SFC Veh. Cdr. Certificate to command a recon Sect. (M8), PK section or a supporting sect. M113, to be an L. I. in the Unit.

1	2	3	4	5	6
Sect. Ldr. Refresh: 17	May - 30	June	15	264 hrs.	Tactics: 160
				(6 weeks)	WPS: 49
					Auto: 30
					Commo: 13
					Misc: 12

PURPOSE: To train NCO's who had CC2 sect. Ldr. Certificate before the year 1962, in order to command a M113 mechanized rifle sect., M113 support section. At the same time to review tank section and M8 Armor car.

DETAILED PROGRAM **Armor Officer Basic Course**

Duration: 20 weeks (880 hrs)

TRAINING SUBJECT : HOURS : REFERENCE

I. General Training (99):			
A. Topography (26)			
- Three North Directions and Azimuth	:	3	* Prepare the Test about 10 to 20 questions YES, NO with in 5 or 10 min. Let students do the test before or after the class.
- Direction, binocular, compass.	:	3	
- Map reading	:	3	
- UTM system and looking for coordinates	:	4	
- Map orientation	:	2	
- Point of station	:	4	
- General of aerial photograph.	:	2	
- Military Symbols	:	1	
+ Method to make overlay and diagram	:	4	
B. Method of Instruction (18)			
- Principles and phases of instruction	:	4	
- Organization of a class in the room	:	7	
- Organization of a class out of door	:	5	
- Method to make a plan and a training schedule	:	2	
C. Psychological Warfare (40)			
- Study by the subjects of the Psychological Warfare Office.	:	40	
D. Leadership(8)			
- Principles of commanding and leadership	:	3	
- Basic concept of leadership	:	1	
- Character of a Commander	:	2	
- Leadership in the Platoon (Pract)	:	2	
E. REVIEW (7)			
II. Specialized Training :			
A. Tactics (329)			
1. - Basic training (43)			
- Organization of the Armor Arm, Squadron and Company.	:	2	
- General and employment of Armor	:	2	
- Crew duties and assembly mounting dismounting	:	5	
- Disposition and camouflage	:	8	
- Observation	:	3	
- Order and report	:	3	

- The subordinate means of contact	:	1	:
- Moving security	:	2	:
- How to survive and escape	:	1	:
- The mounted combat formation	:	5	:
- Dismounted formations	:	5	:
- Concept of the guerilla warfare	:	2	:
- Guerilla activities	:	2	:
- Ambush and reaction when caught in ambush	:	2	:
(2) - <u>Section Training(23)</u>			
- How to maneuver an armor section	:	5	:
- Armored car section in patrol and road security	:	8	:
- Tank Section in attack (opportunity objective)	:	5	:
- M113 Section in dismounting and research	:	5	:
(3) - <u>Basic principle of Tactics (15)</u>			
- Principle of attack and pursuit	:	3	:
- Principle of defence	:	3	:
- Principle of river and swamp crossing operation	:	2	:
- Principle of operation in the city	:	2	:
- Principle of riot control	:	2	:
- Principle of night operation	:	1	:
- Principle of security	:	3	:
(4) - <u>Platoon Training</u>			
(a) - <u>Armor Platoon (47)</u>	:		:
- Organization, characteristics, ability: and mission of the armored car platoon	:	1	:
- Platoon in march and bivouac, method: to occupy the assey area.	:	8 (3a)	:
- Platoon in reconnoitering the axis, point and area.	:	8	:
- Platoon in patrol and road security	:	12 (3a)	:
- Platoon in escort	:	4	:
- Platoon in reinforcement	:	8 (3)	:
- Platoon reacts when caught in ambush	:	6	:
(b) - <u>M113 Rifle Platoon (73)</u>			
- Organization, characteristic, mission:	:	1	:
- Rifle Platoon in attack and pursuit	:	24 (4a)	:
- Rifle Platoon operates in the river and swamp area	:	8	:
- Rifle Platoon in mopping up and research.	:	16 (4a)	:
- Rifle Platoon in defense of a critical point.	:	8 (4a)	:
- Platoon in encircling, and blocking up:	:	10	:
(c) - <u>Support Platoon (17)</u>			
- Characteristic, capability and mission	:	1	:
- Support platoon in attack mission of the company.	:	8 (4a)	:
- Support platoon in defense mission	:	8 (4a)	:

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|--|---|---------|
| (d) - <u>Tank Platoon (55)</u> | : | : |
| - Organization, characteristic and mission | : | 1 : |
| - Coordinated operation of Infantry and Tank. | : | 2 : |
| - Tank Platoon in attack and pursuit | : | 15 : |
| - Platoon in defense. | : | 4(4a) : |
| - Platoon operates in the city w/ Infantry | : | 8 : |
| - Platoon in supporting fire for Infantry to attack. | : | 8 : |
| - Platoon in reinforce. | : | 8 : |
| (e) <u>Staff (15)</u> | : | : |
| - Staff organization in the army | : | 2 : |
| - Operation plan | : | 3 : * |
| - Situation estimation | : | 3 : * |
| - Organization of treatment and evacuation in the armor Company and Squadron | : | 2 : |
| - Vehicle and equipment demolition | : | 1 : |
| - Intelligent and counter intelligent | : | 2 : |
| - Measures towards the POW | : | 2 : |
| (f) <u>Knowledge about the friendly units (20)</u> | : | : |
| - Artillery | : | 4 : |
| - Engineer | : | 4 : |
| - Air Born | : | 2 : |
| - Marine Corps | : | 2 : |
| - Transportation | : | 2 : |
| - Ordnance | : | 2 : |
| - Quartermaster | : | 2 : |
| - Signal | : | 2 : |
| (g) <u>Review and rehearse the Platoon (18)</u> | : | : |
| B. <u>WEAPONS (145)</u> | : | : |
| (1). <u>Individual weapons (6)</u> | : | : |
| - Grenade | : | 1 : |
| - Pistol Colt | : | 1 : |
| - Carbine | : | 1 : |
| Light MG Thompson | : | 1 : |
| - M1 Rifle | : | 1 : |
| - Portable Flame Thrower | : | 1 : |
| (2). <u>Crew Served Weapons (22)</u> | : | : |
| - Sub MG BAR | : | 2 : |
| - 30 cal MG | : | 4 : * |
| - 50 cal MG | : | 4 : * |
| - M79 Grenade Launcher | : | 2 : |
| - 81mm Mortar | : | 6 : * |
| - 57mm Recoiless Rifle | : | 4 : |

(3) - <u>Turret and Gun (15)</u>	:	:
- Turret of Armored car	:	1 :
- Turret of M41 Tank	:	3 :
- 76mm Gun	:	8 :
- Cupolar of M113 APC	:	1 :
- Inspection of weapons and ammunition	:	2 :
(4) - <u>Sight instruments (15)</u>	:	:
- Direct fire sights	:	3 :
- Telescope adjustment	:	4 :
- Quadrant M1 and M9	:	2 :
- M31 Azimuth indicator	:	2 :
- Aiming circle	:	4 :
(5) - <u>Fire Training (23)</u>	:	:
- General of Armor Firing	:	2 :
- Range determination	:	2 :
- Technique of night firing	:	3 :
- Fire Control	:	6 :
- Adjustment of Artillery and Mortar fire	:	4 :
- Indirect fire	:	4 :
- Preparation of fire execution	:	2 :
(6) - <u>Firing (56)</u>	:	:
- Firing with the Pistol, Carbine and SubMG	:	4 :
- Firing with the M1 Rifle w/Grenade Launcher	:	4 * :
- Firing with the 57mm R.R.	:	4 :
- Firing with the 81mm mortar	:	4 (4a) :
- Gunnery, Table I, II, and III	:	8 :
- Zeroing	:	4 :
- Table IV	:	4 :
- Table V	:	8 :
- Table VI	:	8 :
* Table VII A	:	8 :
- Table VII B	:	(4a) :
(7) - <u>REVIEW (8)</u>	:	:
C.- <u>AUTOMOTIVE (186)</u>	:	:
- General of Automotive (39)	:	:
- General about automobile	:	2 :
- Engine: Element, Classification	:	2 :
- 4 Stroke Cycle	:	2 :
- Distributor	:	2 :
- Fuel System	:	2 :
- Lubrication system	:	2 :
- Cooling System	:	1 :
- Ignition System with the Battery	:	4 :

- Carburation and the Simple Carburetor	:	2	:
- Principle of Automatic Principles and the Modern Carburetor	:	2	:
- Cluth System	:	2	:
- Hydraulic Cluth System	:	2	:
- Transmission and Automatic Transmission Box	:	3	:
- Differential and Final Drive System	:	2	:
- Tyres and Inner Tubes	:	1	:
- Steering system	:	2	:
- Suspension system	:	1	:
- Brake system	:	2	:
- Electrical System	:	2	:
- Diesel Engine	:	1	:

(2) ARMOR TECHNIQS (14)

- 1/4 T Truck	:	1	:
- 3/4 T Truck	:	1	:
- 2.5 Diesel Truck	:	1	:
- Armored car	:	3	:
- Tank M41	:	4	:
- M113 APC	:	4	:

(3) PREVENTIVE MAINTENANCE (56)

Maintenance instrument	:	2	:
- Care of engine	:	1	:
- Care of the carburetor, fuel system	:	2	:
- Care of the carburetor and cooling system	:	1	:
- Care of the electrical system, battery	:	2	:
- Care of transmission	:	2	:
- Care of steer unit, suspension system	:	2	:
- Care of wheel, tire, inner tire disassembly and assembly	:	1	:
- Care of the break system	:	1	:
- Maintenance period and system	:	2	:
- Daijy maintenance of the wheeled von. 1/4, 3/4, 2.5T, Armored car	:	8	:
- Daily maintenance of the tracked vehicle, M113 and M41	:	8	:
- Weekly maintenance of the tracked vehicle	:	3	:
- Monthly maintenance of the wheeled vehicle	:	8	:
- Quarterly maintenance of the tracked vehicle	:	4	:
- 6 months' Maintenance of the wheeled vehicle	:	4	:

(4) REPAIR (33)

- General of repair	:	1	:
- Trouble shooting of fuel and repair	:	12	:
- Troubleshooting of electricity and repair	:	8	:
- Emergency repair	:	4	:
- Disassembly and tension of track of M113 and Armored car	:	8	:

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8

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: 2
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## 2

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(U) ANNEX H

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